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JUNE 1988

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Kung Fu Masters  
must be won

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AMM members and their director

When an American (I was, until I came to Germany) I was convinced that Americans were stupid. It took me a long time to learn to think like a German. I was wrong.

However, it has been a long time since I was in Germany, and I have learned a lot about the German people.

In 1968, I was in a 4000-acre ranch in the state of California. I was there for a long time, and I learned a lot about the German people.

I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid.

I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid.

I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid.

## In line

WILL NOT LONG BE A MEMBER OF THE AMERICAN MUSIC ASSOCIATION (AMA).

I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid. I was told that the German people were stupid.

It was told that the German people were stupid. It was told that the German people were stupid. It was told that the German people were stupid. It was told that the German people were stupid.

It was told that the German people were stupid. It was told that the German people were stupid. It was told that the German people were stupid. It was told that the German people were stupid.

## AMM members and their director





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Cartoon 1



Cartoon 2

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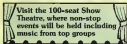
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French Jago goes deep into  
the insides of the  
Commodore Amiga.

# VAMIGA

Whenever the word Amiga is mentioned, someone will have something to say about Commodore's wonder-baby. As first all that was said was how wonderful the machine was, and how it would take the world by storm gradually, however, people saw the Amiga 500ST, at less than half the price — and started wondering.

I have owned an Amiga for nearly six months now, and in that time I think it is safe to say that I have formed a very personal view about a machine which, if used to its potential, can really show the true power of a personal computer.

What makes the Amiga so different from all the other personal computers is its sheer versatility. Being a true multi-tasking machine means that it can do almost as many things as you want simultaneously, enabling you to jump from one task to another with the knowledge that all the other tasks will continue.

## Hardware

To successfully explain the Amiga you must really split the hardware into different sections, specifically: workbench, graphics, sound, and peripherals. Although this cannot cover everything to do with the Amiga, it should give you a valuable insight into the machine.

## Specification

The specification given here is of the American Amiga, when launched in Europe it will probably come with two disk drives and 512K as standard.

Basically the components of the Amiga are:

- Motorola MC 68000 16/32 bit main processor
- 256K bytes of internal RAM; expandable to 512K
- RAM bytes of ROM containing a real-time multi-tasking operating system with colour graphics and animation routines.
- Built-in 35" double-sided disk drive
- Expansion port for up to 3 external disk drives, with either 35" or 55" double-sided
- Fully programmable serial port
- Fully programmable parallel port
- Two built-in mechanical mouse
- Two 8-pin D type connector ports
- Detached 80-key keyboard with numeric keypad, 18 function keys and cursor control
- Ports for analog or digital RGB output, as well as composite video



Left and right drives status output ports (optional connector that allows you to add EMM, hard disks, or other peripherals)



computer's functions via a mouse, and recently it lets each individual user customize his Amiga. Using a program called Preferences, you can choose the colour of the icons, the colour of the background, how sensitive you want the mouse to be, and also redefine the cursor which indicates the mouse position. On the more technical side, Preferences allows you to set baud rates, and redefine the bit images required for your printer.

The Workbench screen, when opened, displays one large window, within which are a variety of drives. On selecting a drive with the mouse, a new window will appear, giving you a choice selection of icons to choose from. Icons can then be described as small pictures which appear on the screen representing tools, projects, disks, shares and the Taskbar Windows let you see the contents of projects, drawings, disks and the Taskbar Windows can be altered both in size and position.

On the current version of the Workbench disk (V1.0) there are four drives — Devices, Utilities, System and

## Workbench

At present, to start up an Amiga system, you must first insert a disk that loads the operating system into write-protected RAM. Although this does take time, it means that in the future when new versions are released, you will not have to wipe about swarming chips around. Having done this you will be requested to insert what is called a Workbench disk. This is the program that makes the Amiga so easy to use, and enables a complete beginner to start harnessing the machine's power.

Once in the Workbench, most people will immediately recognise the Macintosh-esque windows and icons, however the time they are in colour! The Workbench is provided for two real reasons, firstly it lets you control the



# the detailed story



Empty Desktop are three different programs which should have efficient multi-tasking. The Amiga really is a utilities gem, you can on-screen calculator and compose a letter, and system programmer disk copier. The Empty Desktop allows you to create a personal file for the Workbench disk.

To make the most of the system, it is preferable to create your own Workbench disk to suit the type of applications you will be running. I, for instance would define the keyboard for the mouse, and have my Workbench set up accordingly.

## Graphics

If one feature makes the Amiga stand out as a stand-out than any other it has to be the graphics. What makes this, and the sound, so outstanding are the three dedicated chips designed by Jay Miner, founder of Amiga. These chips, commonly called AGAU, GENIE and RAU, effectively allow the main CPU to do other things while they take on

specific roles such as controlling graphics and sound.

In most terms, the Amiga has four resolutions, 320 \* 200, 640 \* 400 \* 380, and 640 \* 400. However, the two modes that involve the use of 400 vertical pixels are more difficult to control as it requires a special feature called interlacing. This allows the programmer to define the needed space to double the vertical resolution.

In each different mode you also have different amounts of available colours. In total the Amiga has a palette of 4096 colours, and in low-resolution you can put up to 12 different colours on screen at once. However the higher resolution modes have correspondingly less available colours. One clever trick that can be used in certain instances however is called HAM (Hold And Modify). This method allows all 4096 colours to be displayed on screen simultaneously, while only working 40K. By producing the quality of colour resolution you can produce pictures of a standard as yet unimagined on a personal computer.

One word that will be recognizable to almost all of you readers. The Amiga can cope with up to eight separate screens at once, each of which can be as tall as is required although only 16 pixels across for information purposes the Amiga also has something called a BitMap (Black Image Transfer) and although this is not more limited to graphics. It can be used to move large amounts of graphical data around the screen at amazing speeds, creating some outstanding effects.

It is features such as the colour palette as well as the filters, that make it obvious what potential the Amiga has as a graphics machine.

## Sound

To complement the Amiga's graphics it comes with a startling potential for sound generation. Controlled by the Paula chip it can produce stereo output through the left and right external sockets, and without too much difficulty, can produce sounds to rival some more expensive synthesizers.

The Amiga provides the user with four separate sound channels, each of which can be used to carry a wide range of sounds, they do not have to be monophonic. By using digital sound and envelopes, the Amiga is quite capable of producing sounds which have been sampled, and then converted to the correct format, only to reproduce them perfectly later.

As well as producing excellent quality sound, the standard Amiga can produce quite fascinating speech, simply by using sample commands, thus rendering software packages are no longer a thing of the past!

## Peripherals

If you want a machine that will grow as a system, then the Amiga certainly has the potential. With its plethora of ports (PL) it should be possible to interface almost anything to this machine, with the right software.

Printers are well provided for in the Proflexion program, with most popular makes such as Epson, Diablo, Commodore, and others all having software already written to take advantage of the graphics.

Mouse is too easy to pick up, with a totally programmable personal pen, it should just be a question of plug-in and go. I am currently running a 128K based modem with no trouble.

## Conclusion

Although I have only managed to touch the surface of what the Amiga is really capable of it is clear to me that, if it is marketed properly the machine could succeed by creating a market, rather than fitting in as a run of the mill PC, that would be a real shame.



## Gareth Thomas brings you your own type-in C&A Database

Age Group	Total	Male	Female	Unknown
18-24	12%	10%	14%	10%
25-34	25%	22%	28%	20%
35-44	28%	25%	32%	22%
45-54	22%	20%	26%	18%
55-64	15%	12%	18%	10%
65+	8%	6%	10%	5%

MANOVLISM IS A COMPLETE database creation and management system for the IBM. It consists of a suite of three programs: the first program is mainly a machine code loader that also contains "user-only" applications such as setting up the files and VIO chips etc. for the main program, and then instructs the management programs. The management programs consist of shell routines serving as interfaces to very powerful data search and edit systems and a computer-aided user method for type and link. The third program is the formal program that allows the user to design a screen screen layout for the input of data using any of the available colours, no vector graphics characters, and even the full-screen editing facilities of the IBM. Then by using a space cursor and an overlaid pop-up menu, it defines the parameters affecting each of the fields in a large display, screen area, and some

The m/c is placed above Racc to read the 48 block at 0000 from 00,000 to 01,000. In taking the Racc memory the m/c is involved between the stored to zero definition when it splits into two, the source memory from 0000 and the column memory from 0008 using m/c control the source can be stored and recalled instantly, for updating the file being stored in this block means that each 1000 is stored in 200 words of up to nine bits each can being allowed a maximum length of 250 characters (five hundred of words could easily be altered up to two or three times, words and although the maximum holding is 250 this would probably never be used and is left at that to impose no constraints on the user. Since using the m/c is dynamic the field length would be set to this, and it would not necessarily be allowed 250 bytes. Details has been to ensure the program will be given later.

The leader will direct the unit's members. They are:

- 1. Intermediary division member
- 2. FIVE-STAR (FIVE) Division member

# DATA BASE 64

Basic input routines and a useful full cursor editing. This has three shortcuts to stop the cursor scrolling: the screen by clearing it across the top and bottom lines, deactivating the color and cursor keys while allowing text shifted, controlled and CBI functions to be regenerated allows the INPUT routine to be entered by pressing function keys as well as by ASCII keys.

2. **Input variable (SCALE - ICHN10)** This routine assumes the first input variable is organized on it by adding the ability to permit the retention of a number of characters in the retained, allowing only certain data in the retained which can be printed and can be of four types:  $\alpha$  = alpha numeric, digit, numeric or for any other numeric data being entered; it is possible to specify a particular amount of line from memory,  $\alpha$  = alpha numeric.

**A. Curren, ATTORNEY - SCOTSDALE:** This situation is the FIRST AS commercial found in many other States. It uses the federal FICO ratings as 1998 and a type Rater FICO fails to allow participants joining of the new credit bureau systems from the 1998 and

**d. Screen colour (COLOR)** - [COLOR] This shows a copy of the screen layout defined by the format program (except for the top and bottom rows). It shows the screen memory at COLOR—the colour memory at screen.

5. Screen read (SCREEN - READ) This reads a copy of the screen stored by the routine above.

If you uninstall the system on disk then the three programs must be saved under the filenames **MSDOS4.C**, **MSBI.BIOS** and **MSBI.COM** in order to maintain the compatibility with the software used in the main and format programs. Also certain files must be stored in the machine code loader so that the main program of distribution can be executed without any problems.

Types in the following box, with their own header in parentheses.

[illegible]



































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# PROFESSIONAL PACKAGING

**John Murray provides a  
program to smarten  
up your cassette  
library.**

This program allows the user to produce neat relay cards for cassette tape boxes for music tapes or computer data tapes using a Commodore 1520 Printer/Plotter. It uses many of the features of the 1520 including the four character sets, four colours and vertical text for the spine of the inlay.

The program requests input of the tape number, a title for the tape and for each side and the option to fit up to 10 items on the index of each side of the tape. If any input is made incorrectly, then pressing

RETURN on the keys at the next input will cause a jump back to the previous prompt. The printer will then produce the required relay card.

The printer draws an outline for cutting out and labelling the card. The tape number and title are then printed, followed by the title and index for each side. The tape number and title are then printed on the spine. The character set is set automatically depending on the length of the titles required. Finally, the tape title and side titles are printed on the back flap (though if the tape title and side titles are the same, then only one will appear). On completion of the card, the option to print another is given.

Control characters in the text are detailed in preceding READ statements, but these REM statements need not be typed in.



PROGRAM - INLAY PACK	
10 REM *** TAPE INLAY PACK	30 TMR** INPUT TMR
20	(PRINT VAL(TMR))
30 REM *** OF THIS NUMBER	40 IF TMR THEN PRINT "TOD
40	END * 6000 70
50 REM *** FOR YOUR NUMBER	60 IF TMR** THEN 70
60	70 PRINT "CONJECTIVE TMR
70	END * 70
80 REM** (PRINT)	90 TMR** INPUT TMR
90 REM 6000,100	100 IF TMR THEN PRINT
100 PRINT "TOD,INCL,CONJ,	110 PRINT "CONJECTIVE TMR
110 PRINT "CONJECTIVE TMR	120
120 PRINT "CONJECTIVE TMR	130
130	140



```

120 GOTO 1
130 PRINT "*****SHEET 1000**"
140 GOTO 1
150 IF LEN(111140 THEN PR
160 "*****SHEET 1000**"
170 GOTO 1
180 IF LEN(111140 THEN 130
190 IF 1=1 THEN 10
200 IF 111140 THEN 140
210 GOTO 1
220 IF 111140 THEN 130
230 PRINT "*****SHEET 1000**"
240 GOTO 1
250 IF 111140 THEN 130
260 IF 111140 THEN 130
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410 IF 111140 THEN 130
420 IF 111140 THEN 130
430 IF 111140 THEN 130
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990 IF 111140 THEN 130

```

## How It Works

```

10-40 set up and title
50-60 input tape number
100-120 input tape name
130-150 input side info and under names
160-180 ready for output
190-210 set up printer
220-240 drive card control
250-270 print tape number
280-300 print tape title
310-330 print side and side
340-360 print index
370-390 print tape number on spine
400-420 print tape title on spine
430-450 print tape name on back flap
460-480 print side info on back flap
490-510 close file
520-540 request reprint or end

```





### Stuart Cooke puts Arlotsoft's Homepak to work.

If, like me, you use a Commodore 64 as a lot of your work it is very important that it gives quick access to everything that you wish to do. For example you may do a lot of wordprocessing and require access to a database, or a spreadsheet occasionally. No problem, I hear you say, but one of each program. This is a great idea, but one major thing is being forgotten, time.

The C64 and its disk drive are not exactly well known for their speed, in fact most people moan about the lack of it. A typical wordprocessor will take about five minutes to load, a database around the same. Now the problem becomes apparent if you need to do a lot of swapping between programs then a lot of time is wasted loading them all in, deferring the whole point of having a computer around in the first place. Why use a database when a card index file is a lot quicker?

Obviously, if all of the programs that you require are available on one disk, a lot of time can be saved in checking my disks etc. This is exactly what Arlotsoft has done with one of its latest releases, Homepak. A wordprocessor, database, and communications program are all available on one disk.

It is also possible to go one step further. Wouldn't it be great if all of the programs that you needed to use regularly could all be in the computer's memory at the same time? Then a couple of keys and the program needed would burst into life ready to obey your every command. Team-Mate, a program that

looks extremely similar to the JET software that is found on a Plus4, offers just this facility. Both teams have up to three programs can be in memory at any one time. The programs are a Word-processor, a Database and a Spreadsheet. At an added bonus a graphics package, for drawing graphs, pie charts etc. is also present on the software disk.

### Homepak

As previously mentioned the suite of programs pose some way to solving some of the speed problems of the C64 as all of the programs are on one disk. However they are all quite slow in loading and a great deal of disk swapping is necessary if you need to use the other programs.

Each of the available programs are extremely well presented and easy to use - the 17 page manual makes sure of that - and have features that you would probably only expect to see on individual pieces of software costing as much as this complete package.

The manual, even though it is very good, can only be described as meagre. It has been reduced so that it will fit inside the standard disk box that the programs come in. Get a magnifying glass if you are going to be reading a lot of it in one go, you'll probably need it.

Each of the programs are dealt with in turn. Screen shots are used to give you a general idea of what you should see on the screen when certain menus are accessed. And a handy crib sheet at the end of each program's documentation gives a handy reminder of the keys needed to operate the software. I must admit that I had to see the relevance of a very large section of the manual before going to bed, so here is an explanation



of how to use the telecommunications software with Computer and the Commodore Information Service, these are American software services. Come on Arlotsoft, you've gone to the trouble of printing your name on the front of the manual, why not alter the last sentence so that it refers to a British system such as one of the many bulletin boards available on British Telecom Gold. I wouldn't have thought that too many people would be phoning America so that they can follow your instructions.

Homepak - you've guessed it - the wordprocessor, has some extremely interesting features. All of the available commands are selected from a pull down menu that is controlled by the function keys. This means that when you press the release key a menu list, for example the printer format menu, will appear on the screen on top of your text, replacing the text underneath where you have finished using the menu. This is great as you never have to remember any of the commands, such as those for leaders in setting margins, as they can all be called up on screen. There is one slight gripe here however. A reminder could have been put on the editing screen so that you



could see at a glance what function key brought up which menu, it's frustrating to go through them all every time you want to do something. I suppose if you were really bothered you could always stick a bit of paper over your function keys.

When you have finished typing your latest novel you can have a look at what the page layout looks like with the new function. This shows a picture of every page with each letter being represented by a dot. This does come in very useful when things start to be positioned correctly. It may even help you to spot your mistakes in the text.

Of course all of the normal printer facilities such as underlining and spacing are covered, too, though underlining and spacing are dealt with in a strange way. Not only do you have to tell them what where a heading is, you must also tell it where the heading finishes. This means that it is possible to have headings that run over more than one line of the paper when printed. I must admit this did leave me a little confused at first as I didn't tell the program where my heading finished the first time that I used to use this function. The new option showed that something was amiss and I was able to correct the problem before I sent the document to the printer. I told you that was very handy.

Homeland—the database—is a little strange. In case you have never used a database I should explain how you would normally use one. First, a computer is brought up on electronic card index files. You would set up a series of index files which you should enter information. You can then ask the computer to find specific information from what it has stored on disk. An example of a floppy for software may be:

NAME  
ADDRESS  
TELEPHONE

You can see clearly see where the underlay to the old card index starts at. Well, Homeland is really different. Yes, it is still used for information storage and retrieval but there is no hard format as to what can be entered into the system. For example a line entered into the database may be:

Fred's Birthday's August 23rd  
John's Birthday's June 26  
Fred's Address's 101 Main Street

As you can see you almost talk to the computer, and any information can be stored. Once the information has been stored you can ask questions such as:

What's Fred's Address?

And the answer will appear as if by magic.

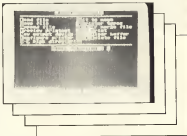
There is no provision within the program for printing a printout of specific information though a separate file to keep a printed copy of any conversations that you have with the computer. And of

course information can be stored on disk for later retrieval in the desktop driver.

Personally, I find this structure of a database very irritating. I can't see any way that you could use this program as a mailing list or store information about a special collection. Even so the program is very clever and good fun to use. No doubt many people will lose the foundations of the program and use it for just those things that I said I couldn't see a way of doing.

One final thing that the program has which I think it is possible to set up a file that holds information such as your name, and your password. These macros can then be used to send the information required to the computer saving you a bit of typing if you access a particular system a lot.

Not much more can be said about these packages. They are all very good and would be worth a look at if the asking price was just for one of them. As I have



Homeland I consider to be one of the most important things about this program. Homeland is becoming cheaper all of the time and more and more people are becoming interested in communicating via computers. Before I go any further it is worth stating that the program is a terminal emulation program which can be used to communicate with systems such as Telecon-Cold. It is not a Windows type system and cannot be used with systems such as Amos or Comshare.

With Homeland and an RSC Information it is possible to talk to your friends who have the software and modems, swap programs with each other and talk to each other via your computer keyboard. Any of the bulletin boards now have Commodore systems on them so you can ask questions to other people who use the system etc. In fact the day of the electronic office is here. One person can write an article using Homeland, send it to someone else via Homeland and they can then print it out using Homeword.

For the more technical back end there the following databases are available, ASCII, CMA (Commodore Address), Videx and the very popular Brevier.

and I found Homeland a little boring but no doubt others will love it. All of the programs are well presented and easy to use. If you need any of the programs then the package is well worth the price even though some of the packs may be missing that is more expensive, individual programs, components have.

## All in one

The other package mentioned is Team Mail. What makes this program stand out from the rest is the fact that it is possible to have all of the programs in memory at any one time. Obviously, this means that you are limited to how much space is available on your floppy for specific tasks. Team Mail gets around this in a very clever way. It allows you to choose, upon loading the software, exactly what you want in memory. Below is the menu presented when you load the software.

- (1) Desktop (3 pages)
- (2) Plot Graph (1 page)
- (3) Write File (2 pages)
- (4) House Office (2 pages)
- (5) Utilities



Driving with each option in some Desktop computers of a wordprocessor, spread sheet and file manager (plus more) all of which are loaded into memory at the same time and only need to switch between.

Plus Graph is a stand alone business graphics program that is used to display information from either the spreadsheet or entered by hand.

Wing file manager of the wordprocessor and the file manager both new with a help facility.

Home Office is Wordprocessor plus help and a spreadsheet plus help.

Utilities are such things as 'Format Disk and Resource file'.

As can be seen from the above breakdown quite a number of differing tasks are covered for my personal favourite is Winable. This allows me to have a database at my fingertips with information such as company addresses and telephone numbers, and access to a fully decent wordprocessor at the same time. Up until now the only that has been possible was to have two disks on my desk.

for the users. Granted that the software does have its limitations but in my opinion there are more than adequately advantages due to the software's convenience.

As with the Plus's only 65 lines of text can be entered into the wordprocessor. This doesn't sound too many but when you realize that a line is 66 characters a quick calculation will show that around 1000 words can be entered before you run out of room. This is more than enough for the standard letter that you wish to write. All of the usual commands are present in the wordprocessor, such as formatting and margins. There are however some notable omissions, such as the lack of headings and footers. A surprising oversight considering this problem is given in the manual, but more of this later.

Obviously the wordprocessor is not as sophisticated as many of its competitors. There are no fancy menus or icons in this program. Don't forget that you do have the Help function in the expanded version which soon solves this problem. It is remarkably easy to transfer data from both the spreadsheet and database into the wordprocessor. In fact the only

over paper back in the program and tell the program to print the information in the database at the top of every page of paper. (clever huh)

As with the Plus's, a preview function is also available within the wordprocessor. This function is not present in Desktop the program just the text to the screen as it will appear on the printer. The drawbacks of the screen text is a window over the larger 65 columns of the text.

The database or file manager is more what I would call a real database. Unlike you can the program program set up a specific format for all entries, such as the one given earlier in this article. Information is then entered as requested by the program and stored on a disk for retrieval at a later date. Again no fancy icons or prompts on this program and it is a little awkward to use at first. But it does its job and is very handy.

Commands available allow the user to move to specified records, search for a specific piece of information, review records, update records and even copy records. It is possible to sort records using a specified field, it is even possible to do a sort on disk with up to three fields.

The expanded file manager, available from word file but without the wordprocessor present, offers even more facilities for the more advanced user. Examples of added commands are 'makeentryfield' and 'showentry' which make a specified field the main field in a record, speeding up of searching and saving and print the contents of the key field respectively.

The Spreadsheet is not exceptionally large: 50 rows by 17 columns. This means that it is not suitable for use in a large business but is good for working out budgets or costing regimes. Don't forget you can even get the wordprocessor to print out a letter taking information from the spreadsheet making printing bills very easy. In fact and very nice touch is the ability to have half of the screen displaying the contents of the wordprocessor and the other half the spreadsheet. This makes it very easy for you to see exactly what you are doing.

The manual for the suite of programs is written in such a way that even a beginner could get started without too much difficulty. All aspects of the programs are dealt with in little examples. For instance the section on the spread sheet shows how you could set up a budget sheet showing all the money that you have spent or saved.

Transmits can only be distributed as the programs that a lot of Citicom users have been waiting for. C&A as it has its limitations but there are ways to get around these. The fact that the programs you are going to install are loaded into memory (and the more and that data can be stored on one disk is a superb idea) in the program is the saving, and that's it. Everything is at your finger tips. Now I've started using the programs I wouldn't be without them.



As I have previously mentioned the software is very similar to the original Commodore Plus/Compuserve. The layout of the programs and the instructions for use are very similar, i.e. the same. For this reason the software will probably get the same stick that the Plus/4 did when it arrived on the market. Only Winable in the wordprocessor and other such differences accounted when that board

help to print information from the database is via the wordprocessor. It is even possible to select certain fields for printing, this makes the program very good for advertising letters or printing labels. It is this facility that allows you to add headings to articles. Simply leave space at the top of every page for the header when you print your text. Then set up your header as a database file then print











## THE WIND AND THE BIRDS OF TERROR

Microsoft CD



**CLARENCE CLARK** is a CD-ROM specialist with several years of experience in the development of interactive, computer-based training systems. He has worked on the CD-ROM for several years, and has been involved in the development of several CD-ROMs for the military, including the CD-ROM for the U.S. Army's *Advanced Infantry Training*.

The most notable of these is the CD-ROM for the U.S. Army's *Advanced Infantry Training*, which is a CD-ROM that is used for training soldiers in the use of the M16 rifle. The CD-ROM is a CD-ROM that is used for training soldiers in the use of the M16 rifle.

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## COMMANDER

Don Dink, MacIntosh CD



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## SUPERBOWL

Commodore  
C64

10 10 10 10



**THIRTY SIX TWENTY FOUR**  
Thirty six! Hup! Hup! Yes, also considerable dollars. Chicago Superbowl has finally arrived, another considerable masterpiece and winner of pumpkins. Most of the dollars were due to various game-play problems (more of over 100 points were being recorded) but otherwise have been sorted out.

For all American football will know that despite initial appearances, there is actually a great deal of skill involved in the game, depending on tactics and timing to predetermined patterns. Coach has managed to pack a lot of detail into the game, although some points are peripheral. It displays with a minimum of visual fuss in the most efficient for people who know nothing at all about this thrilling game; there is an audio tape included in the package which gives you a quick run down on the rules, terms and basic tactics. This works very well and is a lot better than the normal 52 page booklet that you usually get.

The screen is divided into two main sections. On the right is an overhead view of the playing area. This depicts the timing, position of the move that you want to try and execute and then follows the move through once the ball has been snapped. You control one previously determined player although it is possible to change this during the course of the play if you are fast enough. Eleven men on each side running in 22 different directions takes quite a lot of going, doesn't it?

The left hand side of the screen serves two functions. As a purely decorative part of the game, an action replay of the previous play appears on the glass screen. This shows the players running, throwing, kicking and catching the ball and is nicely animated although it tends to get a bit repetitive after a while. You can stop the display with a quick press of the fire button.

The really gutsy part of the game - deciding on your tactics - is determined through a series of moves. Starting with the offense, an initial menu gives you the chance to try a long or short pass, a running play or a special play (field goal attempt, punts and goal line stunts). These choices lead into sub-menus giving you a choice of starting formations with such exotic names as 'dodge' and 'split end'. Selecting 'new line front' from the menu allows you to watch the players moving to their designated positions - a very useful option that gives you some understanding of the theory behind the maneuvers. You can also change which player you want to receive the ball once the move has started.

When you are happy with your choice, the play begins, option eleven post responses for the computer to decide on their defensive strategy. As soon as that is ready, the move is ready to be executed. The coach snaps the ball back to the quarterback while the other players start to move upfield according to your instructions. A quick press of

the fire button moves the camera around the playing area, starting with the one that you previously designated. As your finger is removed from the button, so the ball is thrown and the receiver comes under joystick control. He must then move so where he thinks the ball is going to land in he understands to catch it.

Instead of passing the ball the offense may, or so back as without attempting to score a field goal or a rope punt to relieve their frustration. Keeping the fire button pressed brings up a power scale showing the percentage of the receiver's back run-out chance. It is tempting to go for full every time but this is wrong as the accuracy of a kick decreases with power.

The defense is somewhat more complicated to operate. Apart from choosing your initial formation from 1-4-4, 4-3-4, 4-2-3 and 7-1-3, you must also decide who is going to mark whom which players are going to do it. The options are

holding the ball and which offensive player will initiate a punt. Again, you can decide which player you wish to control in the ensuing move (number 71 William 'The Fridge' Perry is likely to be a popular choice).

Superbowl is the best American football game seen to date. Based on the January game in which the Chicago Bears thrashed the New England Patriots 40-10 in an extremely one-sided situation. Devotees of the game need look no further for people who know absolutely nothing about the game who not try your hand before the new season starts on Channel 4.

CEN







## ARCHON II: ADEPT

Address  
 C12-05, joystick required, C64



ARCHON WAS ONE OF THE most original strategy games ever written... jarringly varying tactical war. Now Electronic Arts has released a sequel to the Amstrad/Atari label Archon II, Adept, now you're taking sides in an epic struggle between the Master of Order and the Minions of Chaos in a game featuring both strategy and magic elements.

The strategy takes place on a screen measuring the four cardinal areas representing the classical elements of Earth, Water, Air and Fire. In addition there are two central squares which represent the road and the home squares for each side—the Fortress of Order and the Temple of Chaos.

The aim of the game is to occupy all power points. Two of these are the road squares and the other four are the outer corners of the elemental lands. These four points make traps hard to land. You can also win by the total annihilation of the opposition's forces.

Now start the game without ado—see as each element each turn they can either move or cast a spell providing that you have sufficient energy to carry out your choice. There are seven spells to choose from but the one that you will use more than any other is "Immune". This is used to bring another piece on the board.

The other spells available to you are: heal one of your

pieces, weaken an opponent's piece, improve an enemy release one of your own imprisoned pieces, banish a hostile enemy or something called "spellquake" which is a final battle used to put your adversary out of his misery. Casting spells costs varying amounts of energy depending on its potency. How much energy you have at your disposal depends on how many power points you occupy.

There are two types of pieces that can be transported across the elements. Both sides have the same dragons in their disposal—purple means one the purple and dragons while dark elements are different. Order can call on the services of a pure "Island" thunderbird and valiantly representing earth, water, air and fire while Chaos has a "beast" which is a dark and locked available to him.

All these characters have different strengths and weaknesses when it comes to combat. Some for example you have to say on the opposite side to the "Island" dragons but the "beast" which is a dark and locked available to him can do so much more of the same and to make matters worse the "Island" dragons are a pure energy on wheels. It just doesn't seem appropriate out of the way.

Combat occurs when two

pieces want to occupy the same square. The same switches to the background where you must make instant decisions as you try to probe the opponent's weaknesses and utilize your own strengths to their best advantage. Each piece's strength is displayed as an energy bar (visible on the screen) the reason for such successful means indicated. When the bar reaches zero the side dies leaving the victor in sole possession of the disputed square.

As might be expected pieces fight best when in their home elements—e.g. Islands in the water land. After you have fired your thunderbird or whatever it takes time before you are allowed to fire your next. The time interval varies from piece to piece and the computer lets you know with a ping—high or low depending

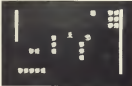
on which side you're on. The battle ground has a number of barriers which must be destroyed in order to strategically. The different elements have differing effects on missiles and spells. For example fire works on water but leaves missiles untouched while earth destroys missiles and slows them.

Control of the game is entirely via a joystick. Spells are selected from a menu while movement is achieved by moving a square shaped cursor. Moving toward the combat screen is straight forward. During a battle involves getting the fire button and moving the joystick to the desired direction. Adept can move that includes what is light—a useful trick to know.

Archon II features a wide range of options to choose from. Which side you play, number of players and their skill levels for wanted though, the computer plays a very mean game and you are likely to be defeated in your first few games. I would strongly recommend that you watch the demonstration games a few times so that you can get some idea of the strategies and tactics required.

Archon II is an excellent strategy game and one that will take you a lifetime to master—then you can play with the other side and learn a totally new set of tactics. What it doesn't quite reach the excellent standards set by the original that is no real criticism and the game due to be commercially reimagined.

C.B.B.









Save your fingers a lot of  
work with our new software  
service.

# SOFTWARE FOR SALE

IT'S HARD TO EDDIE IN THE MORNING. You sit at the computer keyboard having just finished a marathon typing session, cringing one of the superb programs from Your Commodore. Your fingers are stiff for the keyboard and press the letters R, E, D and M. You sit back, exasperated and nothing happens.

Well, I'm sure that we have all had problems before now. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look, so how many people help you, you can usually guarantee that at least another bug slips through unnoticed.

Here at Your Commodore we judge ourselves on the quality of listing that we put. Unfortunately this usually means that they are also very long. Thus taking longer to type in and leaving more room for errors. All of the listings in Your Commodore are taken straight from a printout of working programs. It is therefore very unusual for errors to appear in the magazine.

Because of the length of our programs we do get a large number of requests from readers who would like us to put specific

programs on tape or disk for them. Obviously this is very time consuming and means that we can't spend as much time working on the magazine as we would like.

We are therefore pleased to announce the start of the Your Commodore Software Service. Most of the programs from each issue of the magazine will now be available on single cassette for a price of just £4.95. We will not be making disk available as they would have to be a lot more expensive and more difficult to post. This shouldn't cause you any

problems though as none of the programs will be protected and it will be a simple matter to save the programs to disk yourselves.

All programs on the cassette will be saved using a tape label routine. However we cannot guarantee that all programs will work correctly with the tape control present. We therefore recommend that before you use any of the programs you make a copy of the programs on your own cassette or disk and use the version of the program not the original.

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# SPRITE IDEAS

When you are designing a game one of the longest jobs is designing the sprites. If you are good at it then fine, if not your next monster will probably end up looking like a square box with legs.

Now, your Commodore comes to the rescue once again with Sprite Ideas. If you have designed any sprites for games and you don't mind other people seeing your masterworks then why not send them in now. Each month we will be offering £10 for the best 3 ideas.

Your sprites can be anything at all (within reason), if you've designed 3 series of animated characters then send in the lot. We'd love to have a look at them.

So, next time you see an Ogre to put in your new game have a look in this section of the magazine and you may find just what you are looking for.

This month's sprites are from Aasen Khan from Hays, Middlesex



```

* FOREWARD * FORWARD * FRONT *L*  REM SETS UP SCREEN COLOURS AND CLEARS THE
SCR
*0 FORE-STRIGHT *BACK *FORWARD *0 0000 REM FRONT DATA *000 *000 *0000
00 REM ONCE BACK REM ONCE HEAD IN ONCE TYPE PUN 1000 70 000 Y00
100 REM FRONT ONCE  SPRITE 000
100 DATA 0 100 0 0 000 0 00 110 0 010 00 0 010 00 0 010 00 010 00 010 00
*10 DATA 0 110 00 00 00 110 00 00 00 00 010 00 01 000 00 00 000 00 0 000
*20 DATA 0 110 00 0 000 00 0 010 0 00 10 0 0 000 0 0 0 0
*30 REM FRONT ONCE  SPRITE 000
*40 DATA 0 0 0 110 00 0 00 010 0 010 00 00 00 010 00 010 00 010 00
*50 DATA 010 000 00 00 00 010 00 010 00 00 00 000 00 010 00 010 00
*60 DATA 00 010 00 00 00 010 00 00 00 00 0 000 00 0 010 00 0 0 0
*70 REM FRONT ONCE  SPRITE 000
*80 DATA 0 00 0 0 00 00 00 00 00 0 010 00 0 010 00 00 00 00 00

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Listings will be much easier to enter with our new system.

COMMODORE LISTINGS ARE RATHER well known for the horrible little black blots that always abound. Unfortunately the graphics characters which are used to represent graphic and control characters do not reproduce very well and they are also difficult to find on the Commodore keyboard.

In future all control and graphics commands will be explained by a mnemonic within square brackets. This mnemonic is not typed out as printed in the magazine but rather the corresponding key or keys on the keyboard are printed. For example [RIGHT] means press the cursor right key, you do not type in [RIGHT]. All of the examples, what keys to press and how they are shown on the screen are shown below.

Any character that is accessed by pressing shift and a letter will be printed as [Shift] <letter>.

[SH] shift and A

[SH] shift and +

Any character that is accessed by pressing the Commodore key and a letter will be printed as [C] <letter>.

[CA] Commodore and A

[C+] Commodore and +

[C-] Commodore and -

Mnemonic	Symbol	what to press
[RIGHT]		left's right
[LEFT]		shift left/right
[UP]		Shift & up/down
[DOWN]		up/down
[C-]		C-
[C+]		shift & C-
[C]		C
[SH]		shift & C-

# LISTINGS

If any characters are repeated the mnemonic will be followed by a number.

This number is how many times you should enter the character. Any number of spaces given one will also be represented in this form.

[RIGHT]10 press cursor right 10 times

[C+]10 press Commodore and + 10 times

[C-]10 Press the space bar 10 times

Any other character should be easily recognizable for example CTRL-N means press CTRL, and N and SHIFT-ARROW means press the left arrow.

Any number of mnemonics can be enclosed in brackets for example

[SH]&[C+]&[A]10

means type 10 shift A's 10 spaces and another 10 shift A's

Mnemonic	Symbol	what to press
[B]10		10 [BLACK]
[W]10		10 [WHITE]
[R]10		10 [RED]
[CYAN]		10 [CYAN]
[PURPLE]		10 [PURPLE]
[GREEN]		10 [GREEN]
[BLUE]		10 [BLUE]
[YELLOW]		10 [YELLOW]





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# COMMODORE READER'S



S

U

R

V

E

Y





1. Would you please tick the box against the statement which best describes how much of Your Commodore you normally read or look through

- Read or look through most or nearly all the articles/features ☐  
 Read or look through some of the articles/features ☐  
 Just read or look through the occasional article/feature ☐

2. With regard to the advertisements in Your Commodore, do you

- Read or look through most or nearly all of the advertisements? ☐  
 Read or look through some of the advertisements? ☐  
 Just read or look through the occasional advertisement? ☐  
 Very rarely/never look at the advertisements? ☐

3. Thinking specifically about the advertising content of Your Commodore, would you please tick the two main types of advertising matter - Display and Classified - in terms of usefulness (please tick one against each type)

- |                   | Display                  | Classified               |
|-------------------|--------------------------|--------------------------|
| Very useful       | <input type="checkbox"/> | <input type="checkbox"/> |
| Useful            | <input type="checkbox"/> | <input type="checkbox"/> |
| Not very useful   | <input type="checkbox"/> | <input type="checkbox"/> |
| Not at all useful | <input type="checkbox"/> | <input type="checkbox"/> |

4. Have you ever ordered or bought equipment/products after reading an advertisement in Your Commodore?

- Regularly ☐  
 Occasionally ☐  
 Never ☐

If the answer to Question 4 is yes, what was the last item you purchased in this way and what was its value?

5. Does anyone else read your copy of Your Commodore?
- No ☐  
 1 or 2 ☐  
 3 or 4 ☐  
 More than 4 ☐

6. Do you keep your copies of Your Commodore for

- One month ☐  
 Three months ☐  
 Six months ☐  
 A year or more ☐  
 If kept please answer the next

Questions

7. How often do you refer back again to Your Commodore?

- Once a week or more often ☐  
 About once a month ☐  
 Once every three months ☐  
 Less often ☐  
 Never refer to back issues ☐

8. What magazines other than Your Commodore's computer do you read?

- ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

11. Name the three television programmes you view most regularly

- ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

12. Which computer(s) do you own?

- 1-18 ☐  
 Plus/4 ☐  
 C64 ☐  
 C128 ☐  
 Xie 28 ☐  
 PET ☐  
 Spectrum ☐  
 Amstrad ☐  
 BBC ☐  
 Electron ☐  
 Atari ☐

13. Do you own one of the following disk drives?

- TD1 ☐  
 DD1 ☐  
 DD2 ☐  
 DD7 ☐

14. Do you own any of the following printers?

- Commodore printer ☐  
 Epson compatible printer ☐  
 Other ☐

15. Do you own any of the following peripherals?

- Keyboard ☐  
 Lightpen ☐  
 Mouse ☐  
 Co-processor ☐

16. How long have you had a Commodore computer?

- Less than three months ☐  
 Three to six months ☐  
 Seven months to one year ☐  
 One year to two years ☐  
 Over two years ☐

17. Do you use your computer for the following

Original programming	All the time	More than half the time	Sometimes	Never
Typing in games listings				
Typing in utility listings				
Playing games				
Educational uses				
Business uses				



16. Who else uses your computer?

- ☐ Nobody  
☐ Spouse  
☐ Parent  
☐ Children  
☐ Friends  
☐ Other

17. How much do you estimate you have spent in total in the last 12 months on your computing activities?

- ☐ 0-100  
☐ 101-200  
☐ 201-300  
☐ 301-400  
☐ 401-500  
☐ 501-600  
☐ 601-700  
☐ Over 7000

18. How much do you expect to spend on hardware over the next year?

- ☐ 0-100  
☐ 101-200  
☐ 201-300  
☐ 301-400  
☐ 401-500  
☐ Over 500

19. How much do you normally spend in a 12-month period on the following types of software?

20. Do software reviews influence your buying?

- ☐ Yes  
☐ No

21. Were you previously a regular reader of Your Commodore before we incorporated Your C4?

- ☐ Yes  
☐ No

22. Were you previously a regular reader of BOTH Your Commodore and Your C4?

- ☐ Yes  
☐ No

23. Since we incorporated Your C4, do you think that Your Commodore is

- ☐ Better  
☐ Same  
☐ Worse  
☐ PLEASE STATE WHY

24. What do you think about the balance of articles in Your Commodore?

- |                      | More                     | Absent                   | Less                     |
|----------------------|--------------------------|--------------------------|--------------------------|
| News                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Programming articles | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Software reviews     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Hardware reviews     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Book reviews         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cartels to type in   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Utilities to type in | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Business page        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Adventure columns    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Letters              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Competition          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

What else would you like to see in Your Commodore?

25. Are you aware of how Commodore's selected publication date?

- ☐ Yes  
☐ No

26. If you answered yes to Question 25, do you attempt to purchase the magazine on that day?

- ☐ Yes  
☐ No

27. Do you normally obtain your copy by

- ☐ Cash at purchase  
☐ Newspaper home delivery  
☐ Newspaper shop collection  
☐ Subscription

28. If you do not obtain your copy by subscription, is it due to one of the following?

- ☐ Subscription too expensive  
☐ Good availability through local newspaper  
☐ Not every issue is required  
☐ Have subscribed previously but lapsed it

29. If you do not subscribe, from which type of newspaper do you most often obtain your copy?

- ☐ High Street shop  
☐ News shop  
☐ Travel Point  
☐ Corner shop

30. Are you a member of a computer club?

- ☐ Yes  
☐ No

If yes, please give details.

	Games	Business Software	Educational Software	Utilities
0-250				
251-500				
501-750				
751-1000				
1001-1500				
1501-2000				

31. Do Software Charts influence your buying?

- ☐ Yes  
☐ No

32. Which things do you type in?

- |           | All                      | Some                     | None                     |
|-----------|--------------------------|--------------------------|--------------------------|
| Games     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Utilities | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

33. Please tick the box which best describes you:

- ☐ New reader (within the last 3 months)  
☐ Established reader  
☐ Occasional reader

34. Which other computer magazines do you regularly buy?

- ☐ Commodore Horizons  
☐ Commodore User  
☐ Commodore Computing International  
☐ Stage 34  
☐ Computer  
☐ Your Computer  
☐ Popular Computing Weekly  
☐ Personal Computer World  
☐ Other

35. Please tick the box which represents the annual total of your NET income (i.e. after tax, National Insurance, pension contributions, etc):

- ☐ From £16500  
☐ From £16500 to £17500  
☐ From £17500 to £20000  
☐ From £20000 to £24000  
☐ From £24000 to £28000  
☐ None

36. We would like to thank you very much for your help. The information will be regarded as confidential and will be used solely for the purpose of the survey.



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# GAME

## of the month

Gordon Hamilton explains the  
complexities of US Gold's  
Ultima IV.

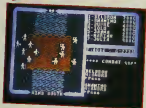
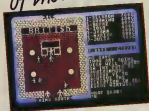
SINCE THE MURDER OF EODRUS WAS destroyed, Lord British, a looking for someone to improve the quality of life throughout the land of Britannia. This involves finding or achieving something called Avatarship which, everybody has heard and nobody appears to know anything.

How you come to be volunteered for this quest is an interesting story. While walking in the countryside you see a bright light and here is a strange square. From there on things get curious and our quest and you are instantly turned by some magic into a gypsy caravan. There an old woman asks you some questions based on various vague justice and other virtues. Depending on your answers, your character is awarded and your profession determined. This may be one of eight types including fighter, mage, thief and singer.

The land of Britannia is a large and varied place. There are eight major towns, each one specializing in one of the eight professions. The people made are friendly and you will need to talk to every one you meet trying to glean useful scraps of information. There are smaller and villages to be explored too if you can find them. Outside of the towns, the land is more hostile - wandering bands of gnomes, goblins and two-headed snakes etc. roam the countryside more on trying to kill you. The land itself can also be hostile - mazes give off poisonous gases that can rapidly deplete your strength although these are harmless as several of the towns who will cure you - for a price.

There are dungeons to be discovered and explored, and thrones to be sought out. Travel is usually on foot although you may be able to buy, or at a better horse to speed up your journey. You will certainly need a map to visit the islands, not all of which are on your map and you will have to learn how to use the map more effectively. There is also a compass to be a bellows or something similar to do it.

As you travel the land and talk to the people, you can try and persuade them to





join your party. Up to seven others can join — one from each of the other professions — paladin, bard, ranger and the priest being the others. Sometimes only join, you when you prove yourself worthy to a certain degree. Experience points are awarded for killing an enemy, for looting items and for solving puzzles somewhere you have gained access and power.

Magic plays a crucial part in the game. There are 36 spells to be mastered but before you can think about casting one, you need to know the ingredients and mix them in their correct proportions. There are no magic ingredients that can be bought at any good hardware shop but all the powerful spells require materials or ingredients which are not so easily come by. The spells range of power is made simple, easy, such as the sleep spell, or casting a magical light through fireballs and magical protections to kill and you, a pretty little trick that causes your opponents to attack themselves instead of you. Completely magical fighters and sleep herbs has some magical ability although how much depends on your job and experience level.

There is a lot of fighting to be done if you are to win your quest. Combat takes place on a matrix of tactical squares and you can move, attack or cast spells for each of your characters to turn. How the battle goes depends on what weapons

and armor your party possess and how you deploy your forces. The use of stings and bows, especially by the members at the back of your party is recommended. The monsters — over 20 different types — fight intelligently and will run away if hurt, persisting leaving behind a message that although they frequently suggest in your try to open it.

So what of the quest itself? The first part involves opening a portal (frustrating in the night vision) — hence the humorous articles, honest comparisons, justice and spirituality. The quest trackwork keeps you informed as to your progress and should be visited frequently. At the appropriate time you have to go and meditate at a shrine — periods of this you find a hand the correct time to give you information and have found the appropriate means to a quest. Only then will you be granted a vision. Apart from that you will need to find some coloured gems — I found the red one on the right level of Dragons Denial. After that I don't know apart from the fact that there will be some heal medicine at a place known only as the Abyss.

Other things to look for are secret passages which abound in caves and dungeons and the gold which you will need to purchase magical items and gear very useful for mopping dragons. A secret will be an important purchase.

If you can find something to sell you can. Above all, you gain information and write everything down. The amount of work and expense that you have to put into gaining even the smallest clue is phenomenal.

The display is at three main boxes. A large map displays your current position (line of sight vision only). The top right hand box displays the character data and your party while the bottom box is used for command entry and as a general information box. Everything in the game is controlled by simple key strokes commands apart from conversations which usually only require a single word. The game comes beautifully packaged with two large books, a map and a reference card.

Ultima IV is a superb game and more so ahead of any of its rivals. To date, I have played it for well over 60 hours and still find that I have not scratched the surface of it. If you only buy one game this year, make sure it's Ultima IV.

## Touchline

**Ultima IV — C4**  
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## Commodore 64

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5) Galaxy Warfare	21) The War	37) Atlantis
6) Galaxy Warfare	22) The War	38) Atlantis
7) Galaxy Warfare	23) The War	39) Atlantis
8) Galaxy Warfare	24) The War	40) Atlantis
9) Galaxy Warfare	25) The War	41) Atlantis
10) Galaxy Warfare	26) The War	42) Atlantis
11) Galaxy Warfare	27) The War	43) Atlantis
12) Galaxy Warfare	28) The War	44) Atlantis
13) Galaxy Warfare	29) The War	45) Atlantis
14) Galaxy Warfare	30) The War	46) Atlantis
15) Galaxy Warfare	31) The War	47) Atlantis
16) Galaxy Warfare	32) The War	48) Atlantis

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# T P D R W

## Allen Webb engineers the complexities of medium-res graphics.

Everyone talks a lot about high resolution graphics and how they can be used for brilliant effects and so on. All art is equally pretty having in the past decreased their use (fairly sure) for some applications, however. It may be possible to settle for a lower resolution system.

The CGA, in common with most other cards, has a standard set of standard characters. Amongst these are a number which represent squares one quarter the size of a normal character. These squares can be used to plot lines or dots. Using this system you can achieve a resolution of 48 points across and 30 points up. While you may not consider this too much of an idea, I recently saw two superb pictures drawn in this resolution. The emphasis that artistic ability can overcome system limitations. Remember, also that Jeff Minter's excellent Psychobits uses the sort of resolution.

The routines given here give complete control over the drawing of lines and dots and the manipulation of screen area.

The commands have the following syntax:

To draw:  
 \$R5 \$1713,XP,YP, MODE,  
 COLOR  
 XP,YP are the co-ordinates of the dot.  
 MODE decides how the dot is drawn.  
 0 — is sets the dot

1 — draws the dot  
 2 — fills the dot (is sets it if it is clear). Clears it if it's set.  
 COLOR specifies the colour of the dot. Values of 0-15 to change the colour. A value of 15 leaves the colour unaltered.  
 \$Y limit

\$R5, \$1713, \$1, \$1, \$2, \$3, MODE, COLOR  
 \$1, \$1, \$2, \$3 are the co-ordinates at the ends of the lines.

To Area manipulation:  
 \$15 \$1713, XC, YC, W, H, C,  
 COLOR, MODE, CHOR, AC,  
 XC, YC

XC, YC specify the position of the top left hand corner of the area.

W is the width of the area.  
 H is the height of the area.  
 COLOR acts in the same way as the previous commands.  
 MODE has the effects:

0 — BGR's the area i.e. changes it to reverse field. Repeating the command returns the area.  
 1 — fills the area with the character specified.

CHOR, AC, XC, YC is only required if MODE equals one. A value once it is generated it is retained when MODE=1 so if it is added when MODE=0. The character value is the POKE value which a value of 50 moves the area and a value of one fills the area with the letter A.

The command acts on a 40 by 25 resolution and, therefore, use of range values are required.

I've included a simple demonstration which shows some ways of using these commands. The first uses shades of grey and dotted lines to give a 3D effect. The second is just pretty and uses the area command to lock the pattern.

MODE has the following effects:

0 — clears the line  
 1 — draws the line  
 2 — fills the line  
 3 — draws a dotted line.  
 COLOR is the same as for the dot command.

Both the dot and line commands use the 40 by 25 resolution with the origin at the bottom left corner of the screen. All out of range values are ignored.

```

PROGRAM: 100 RES 130000
2000 FOR I=0 TO 50:DP=0
3000 FOR J=0 TO 25:MODE 0
4000 CHOR=60:POKE 16710,1000
5000:GOTO 0
2000 MODE 0:FOR AC=0:FOR XC=0
3000:FOR YC=0:FOR W=0:FOR H=0
4000:FOR C=0:FOR MODE=0
5000:FOR I=0:FOR J=0:FOR K=0
6000:FOR L=0:FOR M=0:FOR N=0
7000:FOR O=0:FOR P=0:FOR Q=0
8000:FOR R=0:FOR S=0:FOR T=0
9000:FOR U=0:FOR V=0:FOR W=0
1000:FOR X=0:FOR Y=0:FOR Z=0
1100:FOR A=0:FOR B=0:FOR C=0
1200:FOR D=0:FOR E=0:FOR F=0
1300:FOR G=0:FOR H=0:FOR I=0
1400:FOR J=0:FOR K=0:FOR L=0
1500:FOR M=0:FOR N=0:FOR O=0
1600:FOR P=0:FOR Q=0:FOR R=0
1700:FOR S=0:FOR T=0:FOR U=0
1800:FOR V=0:FOR W=0:FOR X=0
1900:FOR Y=0:FOR Z=0:FOR A=0
2000:FOR B=0:FOR C=0:FOR D=0
2100:FOR E=0:FOR F=0:FOR G=0
2200:FOR H=0:FOR I=0:FOR J=0
2300:FOR K=0:FOR L=0:FOR M=0
2400:FOR N=0:FOR O=0:FOR P=0
2500:FOR Q=0:FOR R=0:FOR S=0
2600:FOR T=0:FOR U=0:FOR V=0
2700:FOR W=0:FOR X=0:FOR Y=0
2800:FOR Z=0:FOR A=0:FOR B=0
2900:FOR C=0:FOR D=0:FOR E=0
3000:FOR F=0:FOR G=0:FOR H=0
3100:FOR I=0:FOR J=0:FOR K=0
3200:FOR L=0:FOR M=0:FOR N=0
3300:FOR O=0:FOR P=0:FOR Q=0
3400:FOR R=0:FOR S=0:FOR T=0
3500:FOR U=0:FOR V=0:FOR W=0
3600:FOR X=0:FOR Y=0:FOR Z=0
3700:FOR A=0:FOR B=0:FOR C=0
3800:FOR D=0:FOR E=0:FOR F=0
3900:FOR G=0:FOR H=0:FOR I=0
4000:FOR J=0:FOR K=0:FOR L=0
4100:FOR M=0:FOR N=0:FOR O=0
4200:FOR P=0:FOR Q=0:FOR R=0
4300:FOR S=0:FOR T=0:FOR U=0
4400:FOR V=0:FOR W=0:FOR X=0
4500:FOR Y=0:FOR Z=0:FOR A=0
4600:FOR B=0:FOR C=0:FOR D=0
4700:FOR E=0:FOR F=0:FOR G=0
4800:FOR H=0:FOR I=0:FOR J=0
4900:FOR K=0:FOR L=0:FOR M=0
5000:FOR N=0:FOR O=0:FOR P=0
5100:FOR Q=0:FOR R=0:FOR S=0
5200:FOR T=0:FOR U=0:FOR V=0
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4810:FOR G=0:FOR H=0:FOR I=0
4820:FOR J=0:FOR K=0:FOR L=0
4830:FOR M=0:FOR N=0:FOR O=0
4840:FOR P=0:FOR Q=0:FOR R=0
4850:FOR S=0:FOR T=0:FOR U=0
4860:FOR V=0:FOR W=0:FOR X=0
4870:FOR Y=0:FOR Z=0:FOR A=0
4880:FOR B=0:FOR C=0:FOR D=0
4890:FOR E=0:FOR F=0:FOR G=0
4900:FOR H=0:FOR I=0:FOR J=0
4910:FOR K=0:FOR L=0:FOR M=0
4920:FOR N=0:FOR O=0:FOR P=0
4930:FOR Q=0:FOR R=0:FOR S=0
4940:FOR T=0:FOR U=0:FOR V=0
4950:FOR W=0:FOR X=0:FOR Y=0
4960:FOR Z=0:FOR A=0:FOR B=0
4970:FOR C=0:FOR D=0:FOR E=0
4980:FOR F=0:FOR G=0:FOR H=0
4990:FOR I=0:FOR J=0:FOR K=0
5000:FOR L=0:FOR M=0:FOR N=0
5010:FOR O=0:FOR P=0:FOR Q=0
5020:FOR R=0:FOR S=0:FOR T=0
5030:FOR U=0:FOR V=0:FOR W=0
5040:FOR X=0:FOR Y=0:FOR Z=0
5050:FOR A=0:FOR B=0:FOR C=0
5060:FOR D=0:FOR E=0:FOR F=0
5070:FOR G=0:FOR H=0:FOR I=0
5080:FOR J=0:FOR K=0:FOR L=0
5090:FOR M=0:FOR N=0:FOR O=0
5100:FOR P=0:FOR Q=0:FOR R=0
5110:FOR S=0:FOR T=0:FOR U=0
5120:FOR V=0:FOR W=0:FOR X=0
5130:FOR Y=0:FOR Z=0:FOR A=0
5140:FOR B=0:FOR C=0:FOR D=0
5150:FOR E=0:FOR F=0:FOR G=0
5160:FOR H=0:FOR I=0:FOR J=0
5170:FOR K=0:FOR L=0:FOR M=0
5180:FOR N=0:FOR O=0:FOR P=0
5190:FOR Q=0:FOR R=0:FOR S=0
5200:FOR T=0:FOR U=0:FOR V=0
5210:FOR W=0:FOR X=0:FOR Y=0
5220:FOR Z=0:FOR A=0:FOR B=0
5230:FOR C=0:FOR D=0:FOR E=0
5240:FOR F=0:FOR G=0:FOR H=0
5250:FOR I=0:FOR J=0:FOR K=0
5260:FOR L=0:FOR M=0:FOR N=0
5270:FOR O=0:FOR P=0:FOR Q=0
5280:FOR R=0:FOR S=0:FOR T=0
5290:FOR U=0:FOR V=0:FOR W=0
5300:FOR X=0:FOR Y=0:FOR Z=0
5310:FOR A=0:FOR B=0:FOR C=0
5320:FOR D=0:FOR E=0:FOR F=0
5330:FOR G=0:FOR H=0:FOR I=0
5340:FOR J=0:FOR K=0:FOR L=0
5350:FOR M=0:FOR N=0:FOR O=0
5360:FOR P=0:FOR Q=0:FOR R=0
5370:FOR S=0:FOR T=0:FOR U=0
5380:FOR V=0:FOR W=0:FOR X=0
5390:FOR Y=0:FOR Z=0:FOR A=0
5400:FOR B=0:FOR C=0:FOR D=0
5410:FOR E=0:FOR F=0:FOR G
```







Allen Welsh takes you one step further in your quest to master machine code.

# WELCOME TO THE MACHINE

LAST MONTH WE STARTED TO look at the various ways of moving data about. While we concentrated on the source, the principles apply equally to moving data anywhere. I hope you found the homework easy. With that material we covered last time, you should be able to come up with two or three solutions to each problem.

First, I wanted a routine to put a row of data along the top of the screen. Here is one solution:

```
10 A$=MID$(100,
100:REM #40,000)
110:REM L$=14
120:REM L$=50:PRINT
130:REM L$=0:
140:REM L$=140
150:REM L$=1000:REM #40,000
160:REM L$=
170:REM L$=140
180:REM L$=1000:REM #40,000
190:REM L$=
200:REM L$=
```

This uses the graphic character routine in ROM to print characters to the screen at the current cursor position (lines 110 and 120 print ROM (CHR\$(10)) and the method used there is no need to worry about updating the color matrix. Those of you with old ROMs will no doubt be aware that when you set the cursor colour, the colour matrix is not updated. That means that if you move data along to the screen memory you will not necessarily get the colour you want. New ROMs have had this fixed.

The second problem asked you to print the character set on the screen. Here is my solution:

```
10 A$=MID$(100,
100:REM #40,000)
```

```
110:REM L$=14
120:REM L$=1000:REM #40,000
130:REM L$=140,51
140:REM L$=1000,51
150:REM L$=1000,51
160:REM L$=1000:REM #40,000
170:REM L$=1000:REM #40,000
180:REM L$=
190:REM L$=
```

In this routine I have used simple indexing to put characters at the start of the screen memory. Since I don't want to change the address (index), indirect indexing is necessary. There are 256 characters with POKE values ranging from zero to 255. I use the fact in line 108 by using the Y register to update the character to be POKE'd. Lines 140 and 150 take care of the colour matrix for old ROMs systems. The basic equivalent to this routine is:

```
10 FOR I=0 TO 255
20 POKE 1024+I, I
30 POKE 1024+I, I
40 NEXT I
```

Use 170 sets as a slightly different way in the looping we've used previously, but I'll cover that shortly.

There is one more addressing mode which you should be aware of. This is an infrequently used mode called Pre-indexed Indirect Addressing. This mode uses the X register to look for an address in a table and act on the address. The macro used for this mode has the form

(address,X)

where address is a two page location. Here are some examples:

```
10A,($B,X)
11A,($AA,X)
```

The operation takes a little understanding, but here it what a does. Imagine that you have a table of 16 bit addresses stored in a table in zero page starting at \$AA.

```
$AA low byte address 1
$AB high byte address 1
$AC low byte address 2
$AD high byte address 2
$AE low byte address 3
$AF high byte address 3
and so on
```

If I compare the value zero, the instruction LXA (\$AA,X) does the following: To add the contents of X to a zero page address \$AA, to give \$AA. If the accumulator is loaded by the contents of the address held in the resulting byte pair \$AA and \$AB.

Similarly, if I compare two, then the accumulator will be loaded with the contents of the address pointed at by \$AE and \$AF.

This is not an addressing mode that you will use often, but it's worth knowing about in case you have a need for it one day.

Last month I introduced the use of conditional branching. At that time it was simply to allow us to make programs and I made no attempt to discuss it in length. It is now necessary to look at it in more depth.

In the microprocessor is a register called the Status Register. This eight bit register is used to hold various flags each with a bit. The flags and their values are as follows:

## 4. The Carry Flag (C)

This flag is used to carry information on which arithmetic operations are performed. If for example two numbers are added to give a result greater than 255 the

carry flag is set so that you can take appropriate action. We'll discuss this when I deal with 16 bit arithmetic.

## 5. The Overflow Flag (O)

Only the low seven bits are used for holding data, the eighth for eg a sign bit. Hence only numbers in the range -127 to +127 are used. If an operation attempts to store greater than +127, then the overflow flag is set. Again we'll discuss it a later date.

## 6. The Negative Flag (N)

This is set if an operation results in a negative answer.

## 7. The Decimal Flag (D)

This is set if you wish to work in decimal. BCD mode sets the Decimal Flag (D). Set if an integer operation produces a zero result.

The basic instructions are the status of a flag and act accordingly. The instructions provided are:

BCC — branch if carry flag is not clear

BNC — branch if carry flag is clear

BQ — branch if zero flag is not clear

BZ — branch if zero flag is clear

BPL — branch if negative flag is not clear

BPL — branch if negative flag is clear

BVC — branch if overflow flag is not clear

BVS — branch if overflow flag is clear

and so on.

You will generally use these instructions directly after an arithmetic operation. The most used set are:

CMP — this compares the accumulator to data or the contents of a location

CPY — compares the Y register to data

CPS — is analogous to CPY



These three instructions perform a nondestructive comparison by subtracting the data from the register and updating the status flag accordingly depending on whether the result is zero, positive or negative.

```
Register = Data - set carry flag
Register = Data - set zero flag
Negative register unchanged by the sign bit
```

To detect various results, you use

```
Register - data = use BCS, BE, CMP, LB, BCL, LOOP
branches of LOP of accumulator holds four or more
```

```
Register - data == use BCC, EQ, CFF, LOP, BCC, LOOP
branches if LOP of T register holds less than 10
```

```
Register - data == use BEQ, B, BQ, LOP, BQ, LOP
branches if T register holds six
Register - data == use BNE, B, CFF, LB, BNE, LOOP
branches if accumulator does not hold three
```

If you now look back at last month's examples you will see how these four are used. Arithmetic instructions such as INC, INB, INC, DEC, DEC, change the register and zero flag depending on the result. INC and DEC increments and decrements a memory location by one.

Any attempt to operation from last month's homework uses this effect. Line 143 increments for counter. When it reaches 255, adding one must will result in zero. Since this signals that we have finished, line 150 in line 170 to detect this situation.

Now we've collected together the basic tools, let's start writing some decent

routines. In the last part we discussed the use of NOP instructions to create delays. To achieve more substantial pauses we need to use more complex routines. Here is a simple delay routine:

```
100 ASSEMBLE 1000
110 BNE $+60000
120 BNE LDA 1500
130 BNE LOOP1 LDI 1500
140 BNE LOOP2 DFI
150 BNE BNE LOOP2
160 BNE DFI
170 BNE BNE LOOP1
180 BNE RTS
```

This routine uses a pair of nested loops to wait a short time. The values loaded into the first register in lines 130 and 140 define the delay. Lines 140 and 150 count down the Y register to zero. This process is then repeated the number of times in the X register. The final equivalent of this routine would be again of nested loops, such as

```
FOR X=0 TO 10 FOR Y=0 TO 10 NEXT Y
```

An alternative method is to call the routine at \$1000. This routine generates a one millisecond delay.

Let's use this delay routine to generate a stylized breaking pattern. Consider the routine

```
100 ASSEMBLE 110
110 BNE $+60000
120 BNE LDA 1500
130 BNE LDA 1500
140 BNE LDA 1500
150 BNE LDA 1500
160 BNE LDA 1500
170 BNE LDA 1500
180 BNE LDA 1500
190 BNE LDA 1500
200 BNE LDA 1500
210 BNE LDA 1500
220 BNE LDA 1500
230 BNE LDA 1500
240 BNE LDA 1500
250 BNE LDA 1500
260 BNE LDA 1500
270 BNE LDA 1500
280 BNE LDA 1500
290 BNE LDA 1500
300 BNE LDA 1500
310 BNE LDA 1500
320 BNE LDA 1500
330 BNE LDA 1500
340 BNE LDA 1500
350 BNE LDA 1500
360 BNE LDA 1500
370 BNE LDA 1500
380 BNE LDA 1500
390 BNE LDA 1500
400 BNE LDA 1500
410 BNE LDA 1500
420 BNE LDA 1500
430 BNE LDA 1500
440 BNE LDA 1500
450 BNE LDA 1500
460 BNE LDA 1500
470 BNE LDA 1500
480 BNE LDA 1500
490 BNE LDA 1500
500 BNE LDA 1500
510 BNE LDA 1500
520 BNE LDA 1500
530 BNE LDA 1500
540 BNE LDA 1500
550 BNE LDA 1500
560 BNE LDA 1500
570 BNE LDA 1500
580 BNE LDA 1500
590 BNE LDA 1500
600 BNE LDA 1500
610 BNE LDA 1500
620 BNE LDA 1500
630 BNE LDA 1500
640 BNE LDA 1500
650 BNE LDA 1500
660 BNE LDA 1500
670 BNE LDA 1500
680 BNE LDA 1500
690 BNE LDA 1500
700 BNE LDA 1500
710 BNE LDA 1500
720 BNE LDA 1500
730 BNE LDA 1500
740 BNE LDA 1500
750 BNE LDA 1500
760 BNE LDA 1500
770 BNE LDA 1500
780 BNE LDA 1500
790 BNE LDA 1500
800 BNE LDA 1500
810 BNE LDA 1500
820 BNE LDA 1500
830 BNE LDA 1500
840 BNE LDA 1500
850 BNE LDA 1500
860 BNE LDA 1500
870 BNE LDA 1500
880 BNE LDA 1500
890 BNE LDA 1500
900 BNE LDA 1500
910 BNE LDA 1500
920 BNE LDA 1500
930 BNE LDA 1500
940 BNE LDA 1500
950 BNE LDA 1500
960 BNE LDA 1500
970 BNE LDA 1500
980 BNE LDA 1500
990 BNE LDA 1500
1000 BNE LDA 1500
```

You immediately recognize line 210 onwards as being our delay routine. The delay

parameters are held in locations 150 and 151 rather than being loaded as direct values. The line 100 to 150 is up the delay parameter. The core of the routine is lines 160 to 210. It is an infinite loop which changes the colour of the border, delays a bit and then loops back. The subsequence call in line 180 uses the BNE/STOP key. If this key is pressed, then the 210 point, line 200 checks the end of the flag is set. If, missing above with the delay values and see the effect. If you use a lot of care and possibly the old NOP is best time if you may be able to get some satisfactory coloured bands on the border. The next, and last example, is a little more useful.

```
100 ASSEMBLE 110
110 BNE $+60000
120 BNE LDA 1500
130 BNE LDA 1500
140 BNE LDA 1500
150 BNE LDA 1500
160 BNE LDA 1500
170 BNE LDA 1500
180 BNE LDA 1500
190 BNE LDA 1500
200 BNE LDA 1500
210 BNE LDA 1500
220 BNE LDA 1500
230 BNE LDA 1500
240 BNE LDA 1500
250 BNE LDA 1500
260 BNE LDA 1500
270 BNE LDA 1500
280 BNE LDA 1500
290 BNE LDA 1500
300 BNE LDA 1500
310 BNE LDA 1500
320 BNE LDA 1500
330 BNE LDA 1500
340 BNE LDA 1500
350 BNE LDA 1500
360 BNE LDA 1500
370 BNE LDA 1500
380 BNE LDA 1500
390 BNE LDA 1500
400 BNE LDA 1500
410 BNE LDA 1500
420 BNE LDA 1500
430 BNE LDA 1500
440 BNE LDA 1500
450 BNE LDA 1500
460 BNE LDA 1500
470 BNE LDA 1500
480 BNE LDA 1500
490 BNE LDA 1500
500 BNE LDA 1500
510 BNE LDA 1500
520 BNE LDA 1500
530 BNE LDA 1500
540 BNE LDA 1500
550 BNE LDA 1500
560 BNE LDA 1500
570 BNE LDA 1500
580 BNE LDA 1500
590 BNE LDA 1500
600 BNE LDA 1500
610 BNE LDA 1500
620 BNE LDA 1500
630 BNE LDA 1500
640 BNE LDA 1500
650 BNE LDA 1500
660 BNE LDA 1500
670 BNE LDA 1500
680 BNE LDA 1500
690 BNE LDA 1500
700 BNE LDA 1500
710 BNE LDA 1500
720 BNE LDA 1500
730 BNE LDA 1500
740 BNE LDA 1500
750 BNE LDA 1500
760 BNE LDA 1500
770 BNE LDA 1500
780 BNE LDA 1500
790 BNE LDA 1500
800 BNE LDA 1500
810 BNE LDA 1500
820 BNE LDA 1500
830 BNE LDA 1500
840 BNE LDA 1500
850 BNE LDA 1500
860 BNE LDA 1500
870 BNE LDA 1500
880 BNE LDA 1500
890 BNE LDA 1500
900 BNE LDA 1500
910 BNE LDA 1500
920 BNE LDA 1500
930 BNE LDA 1500
940 BNE LDA 1500
950 BNE LDA 1500
960 BNE LDA 1500
970 BNE LDA 1500
980 BNE LDA 1500
990 BNE LDA 1500
1000 BNE LDA 1500
```

Again, the delay routine uses two locations to hold the parameters. This routine

analyses a device rather like the "helpscreen" used on the Saturday afternoon football results service on TV. A snapshot is already printed across the screen with a flashing border cursor. The routine is quite simple.

Line 100 uses the Y register which will act as our counter. Lines 110 and 120 print an address on the top left hand corner of the screen. Lines 130 and 140 update the colour matrix for you. Lines 150 and 160 update the colour matrix for you. Lines 170 and 180 update the colour matrix for you. Lines 190 and 200 update the colour matrix for you. Lines 210 and 220 update the colour matrix for you. Lines 230 and 240 update the colour matrix for you. Lines 250 and 260 update the colour matrix for you. Lines 270 and 280 update the colour matrix for you. Lines 290 and 300 update the colour matrix for you. Lines 310 and 320 update the colour matrix for you. Lines 330 and 340 update the colour matrix for you. Lines 350 and 360 update the colour matrix for you. Lines 370 and 380 update the colour matrix for you. Lines 390 and 400 update the colour matrix for you. Lines 410 and 420 update the colour matrix for you. Lines 430 and 440 update the colour matrix for you. Lines 450 and 460 update the colour matrix for you. Lines 470 and 480 update the colour matrix for you. Lines 490 and 500 update the colour matrix for you. Lines 510 and 520 update the colour matrix for you. Lines 530 and 540 update the colour matrix for you. Lines 550 and 560 update the colour matrix for you. Lines 570 and 580 update the colour matrix for you. Lines 590 and 600 update the colour matrix for you. Lines 610 and 620 update the colour matrix for you. Lines 630 and 640 update the colour matrix for you. Lines 650 and 660 update the colour matrix for you. Lines 670 and 680 update the colour matrix for you. Lines 690 and 700 update the colour matrix for you. Lines 710 and 720 update the colour matrix for you. Lines 730 and 740 update the colour matrix for you. Lines 750 and 760 update the colour matrix for you. Lines 770 and 780 update the colour matrix for you. Lines 790 and 800 update the colour matrix for you. Lines 810 and 820 update the colour matrix for you. Lines 830 and 840 update the colour matrix for you. Lines 850 and 860 update the colour matrix for you. Lines 870 and 880 update the colour matrix for you. Lines 890 and 900 update the colour matrix for you. Lines 910 and 920 update the colour matrix for you. Lines 930 and 940 update the colour matrix for you. Lines 950 and 960 update the colour matrix for you. Lines 970 and 980 update the colour matrix for you. Lines 990 and 1000 update the colour matrix for you.

I realise that I'm spending a lot of time explaining how the program works. As my progress I will make further comments when you should soon be able to find things out for yourself.

On homework time that I want a routine which will fill the entire screen with a specified character. I don't expect the best solution but I've told you enough for a crude but effective routine.

Secondly, I want a routine which will store a block of data from the top line of the screen to, say, the 20th line. A single line of data will suffice but you can really store up to 20 lines. This sort of routine is frequently used in a range of situations.

Finally, I want a routine which will scroll the top line of the screen one step to the right with the leftmost character replaced with a space.

Next month we'll explore eight and 16 bit unsigned arithmetic.







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## P Green brings you

## some hints on saving

## time and memory.

**TIME AND MEMORY CAN BE** saved when a Basic program contains a lot of numerical data statements. This article suggests ways in which you can save both, even on programs copied from magazines.

## The Facts and Figures

If you have a lot of numerical data to be stored, there is a fairly quick and easy way to save time and memory: save the block of memory straight on to the disk or tape and get the Basic program to load the data straight into memory instead of POKEing it in.

Time is saved by this method because when you use data statements within a program, you must first load the data in Basic form and then run the program to POKE the data into memory. It takes 12 seconds for the first half of the operation and so for the second half for each 1K of memory when using a disk drive. Alternatively to transfer the data straight into memory from disk takes only ten seconds for each 1K of memory. Of course, the saving is much greater if you are using tape since tape loading is a much more lengthy process.

Memory can be saved both in the computer and on the disk or tape. In the computer 1K of directly entered data of character takes up just 1K of memory. On the disk or tape it takes up just over 1K of storage space. On the disk, this is a full block. In the case of Basic data statements, however, occupying the 1K of memory once the program has been run, the Basic data also takes up memory — just under 1K. All together this method actually uses just under 4K of memory. On the disk or tape, it takes up well over 1K of storage space — that is, 15 blocks on the disk.

## Saving the Data

So, finally, how can we save a block of memory? And secondly, how can we get our Basic program to load it again?

# DATA, TIME AND MEMORY

The can be done in two ways. You can save a machine code routine to take an area of memory. To do this you will have to get the start address of the block of memory that you wish to save and then calculate the end address and add one.

Your machine code routine of course must not occupy the same area as the memory which you wish to save.

The procedure should be as follows:

- 1 Load and run the Basic program, or at least the part which POKEs the data into memory.
- 2 Now the Basic program and load the machine code routine.
- 3 Do most machine code routines the instructions to save a block of memory is something like

```
5100 REM "SAVE DATA"
```

This will save the block of memory from \$C000 (the start address) to \$C0FF (the end address) on a disk drive with the device number of 0 or 06 hex (\$0 for tape) with a filename "DATA.DAT". (You choose the filename although you do not always need one for files saved on tape.)

4 This may need to save more than one block of data. In instance a block of character data at 10000 and a block of machine code data at 40000. All you need to do for this is to repeat instructions 1-3 for the new block of data bearing in mind that for disks you will need a different filename.

Another and probably easier method is to alter certain pointers on the area page of memory so that you find the computer is thinking that the block that you wish to save is a Basic program. The locations to save are 45 to 48 and hex locations 43 and 44 are the low

and high bytes of the start of Basic which are normally one and eight respectively (2040-1). 2040 is at hex location 43 and 44 are the low and high bytes of the start of variables which is normally the end of the Basic program file one.

The procedure is as follows:

- 1 Calculate the start and end of the block of memory which you wish to save not forgetting to add one to the end.
- 2 Calculate the high and low bytes from these figures in decimal.
- 3 Run the Basic program or the section of it that POKEs the data into memory.
- 4 In direct mode POKE in these figures into locations 43 to 45.
- 5 Save the block of memory by typing in BASIC filename "1" as BASIC filename "1".
- 6 Repeat this for other blocks of memory if necessary.

## The Basic Loader

Now that you have saved your block of memory how do you get your program to load it again automatically? There are two ways in which you can do this. The first is to write a short machine code routine to load the blocks of memory. The second is to add one or more lines to the beginning of your Basic program. The machine code method requires an understanding of how the ROMAL load routine works and would take too long to describe here. Instead I will concentrate on describing the Basic method.

It is actually very easy to get your Basic program to do the loading for you. The most important thing to remember is that once the first block of memory has been loaded the program will start again from the beginning and if you do not do something to prevent it the

same block will be loaded again and again.

The first thing to do is save a copy of the full program, data statements, and all, in case something goes wrong, and keep it safe. Next, remove the data statements and the READ-POKE routine and use a trivial loop and save the program again.

The first line of the program can be used to load the block of memory by using a line such as

```
10 GOTO 100-10000:GOTO  
"filename".1
```

This filename will come in the line you used to save the block of memory. If a tape is used, then first change the right to a one, and if it isn't use a filename. The figure one after the eight or one is required so that the block of memory goes back to where it came.

If there is more than one block of memory to load another line needs to be added, as follows:

```
20 IF $2000:$GAD-5:GOTO  
"filename".4:100  
or in the case of tape, the first line can become:
```

```
10 GOTO 100-10000:GOTO  
"1"
```

Do not use a filename. This will load the first two blocks of memory loaded on the tape.

The way in which the loader works is as follows:

- 1 After the program is run, K=0.
- 2 At line 1, K becomes 1 and the first load takes place.
- 3 After the load the program starts again at line 10 but the variable K is still 1. Therefore K becomes 2 and since this is not equal to 1 the program continues to the next line.
- 4 This will go on until all the blocks of memory have been loaded and the rest of the program can continue.



# FONT

# FACTORY

## FreeType Attkin looks at a new product from Impey.

THE FONT FACTORY (FF) IS AFDL named and works hard for you, doing overtime at your request.

Hardly the requirements are a disk drive, printer and word processor. The printer should, for preference, be the Commodore 16c 1020/1615 GPT although discounts are given for using a postscript interface emulating the HP500 or 800. It is claimed that FF will work with most word processors with open sequential files and I have read (superficially) that with no problems. However it would be worthwhile doing a double-check with the distributor before purchase if you have another word processor at home do not link up.

Naturally there is no manual supplied with FF, instead the program gets to work right away printing out full instructions using the directions given. The resulting 14 page manual is in two parts: one for font factories and one for Superwriter 4d. Both are very well written and the full concept of the programs are easily understood - no hidden complications here!

Following FF create a file document with your word processor and save this as disk. There is no necessity to use the commands of your processor other than direct saving mode. However, and this is most important - your ASCII error file at the beginning, followed by internal should you wish to use a different font in the middle of your document, insert a new font handler followed by (insert) FF has eight or built fonts with which to play around.

Having saved your file to disk, load FF and let it take over. Initially I suggest that you use option three to print your document (there are plenty of screen font options to help you along). Initially FF will ask you to define your font font by selection from a list of eight; this will then be processed for you. The second font style will then be requested and FF gets back to work! When you have defined the number of fonts in your document a simple printer will save you to the next

option. If you select the parameters given on the screen a good idea is to print out your document when told to do so and FF will print your letters in the font selected very simple indeed and very effective.

Three built-in fonts fonts including Helvetica Bold, Roman Gothic and most important of all the Designer. The latter gives you true type font of a high quality as its raster images.

FF is full of options using normal or double width letters and has a very comprehensive list of embedded commands for centring, setting line width left and right margins, optional page numbering and line spacing. All these commands are specially screen controlled. Fonts may also be changed within your documents (did I say reusable?)

More to come: You may define your own fonts (limited or credit card) - the whole process is extremely easy to use and 15 fonts may then be accessed at any one time within your documents including the 15 built fonts. Instructions are clear, concise and readily handled.

In effect you can create an entire character set or change characters from an existing set. If you do not like the A in Gothic font then change it! If you want to change the Greek alphabet - do it!

FF also has a connector program which may be loaded independently. Here again instructions are readily handled when complemented with the manual. The functions independently of a word processor character widths are normal. Surely as double width and the output has two options: one selects print according to the printing characters in your design while the other selects solid line printing mode - the word set in normal width prints a banner around two lines long! FF will stop the printer if you have been too rather slow.

As to FF fonts may be changed and saved as disk. There are standard fonts to consider.

I see no problems in this program, consider it excellent value for money and doubt if you will be disappointed with its performance.

A really professional tool, greatly priced and certainly 'font' is really













# FROGGY

Daryl Bowers shows

you how to kill the  
frog!

WELCOME BACK TO THE  
edge of the frog. This month we  
will be adding the routine  
which controls the status panel  
at the bottom of the screen,  
and the routine which kills the  
frog. Although the latter will  
not function until the checking  
routines are added in the next  
issue.

## Info

The routine begins by passing  
the value of LIFE to be the  
status panel. ONLY undergoes  
whether the frog is dead or  
alive and if dead (DEAD = 1),  
then set this from the routine.

The next four instructions  
pass the values in P000 and  
P000+1 and the following  
seven use the R register as an  
index to point to the five digits  
of MTR00 and MTR01 and to  
place them correctly on the  
screen.

One of the features of the  
game is that it becomes more  
difficult as you progress, and  
this is achieved by increasing  
the speed of the MTR0 and the  
MTR1. These speeds are increased by  
a small amount every time  
another 100 points is scored.  
The next two lines store the  
current digit in the 100 column  
of the screen into MTR000.  
The code which counts out the  
five time in speed appears later  
in the routine.

Lines 10070 to 10100  
decrease the two time delay  
MTR00, and MTR01 to  
check whether another maxi-  
lus passed. If not, then jump  
to F00, which simply returns  
from the routine.

The next eight lines use the  
R register as an index to  
retrieve the MTR00 value R  
the digit being increased  
to reflect time passed over the  
value for 100. The advantage is  
set to zero, and the carry  
is kept. The digit is increased  
by 10000, then the value  
which is 10000 is subtracted

10000

.R000, R001, R002, R003, R004, R005, R006, R007

1000

JOB PLAYER

10010

1

10040

JOB INFO

10020

L00 MTR00

10060

1

10030

ST0 MTR01

10080

1

10040

L00 MTR00+1

10100

1

10050

ST0 MTR01+1

10120

1

10060

ST0 MTR00+1

10140

1

10070

ST0 MTR01+1

10160

1

10080

ST0 MTR00+1

10180

1

10090

ST0 MTR01+1

10200

1

10100

ST0 MTR00+1

10220

1

10110

ST0 MTR01+1

10240

1

10120

ST0 MTR00+1

10260

1

10130

ST0 MTR01+1

10280

1

10140

ST0 MTR00+1

10300

1

10150

ST0 MTR01+1

10320

1

10160

ST0 MTR00+1

10340

1

10170

ST0 MTR01+1

10360

1

10180

ST0 MTR00+1

10380

1

10190

ST0 MTR01+1

10400

1

10200

ST0 MTR00+1

10420

1

10210

ST0 MTR01+1

10440

1

10220

ST0 MTR00+1

10460

1

10230

ST0 MTR01+1

10480

1

10240

ST0 MTR00+1

10500

1

10250

ST0 MTR01+1

10520

1

10260

ST0 MTR00+1

10540

1

10270

ST0 MTR01+1

10560

1

10280

ST0 MTR00+1

10580

1

10290

ST0 MTR01+1

10600

1

10300

ST0 MTR00+1

10620

1

10310

ST0 MTR01+1

10640

1

10320

ST0 MTR00+1

10660

1

10330

ST0 MTR01+1

10680

1

10340

ST0 MTR00+1

10700

1

10350

ST0 MTR01+1

10720

1

10360

ST0 MTR00+1

10740

1

10370

ST0 MTR01+1

10760

1

10380

ST0 MTR00+1

10780

1

10390

ST0 MTR01+1

10800

1

10400

ST0 MTR00+1

10820

1

10410

ST0 MTR01+1

10840

1

10420

ST0 MTR00+1

10860

1

10430

ST0 MTR01+1

10880

1

10440

ST0 MTR00+1

10900

1

10450

ST0 MTR01+1

10920

1

10460

ST0 MTR00+1

10940

1

10470

ST0 MTR01+1

10960

1

10480

ST0 MTR00+1

10980

1

10490

ST0 MTR01+1

11000

1

10500

ST0 MTR00+1

11020

1

10510

ST0 MTR01+1

11040

1

10520

ST0 MTR00+1

11060

1

10530

ST0 MTR01+1

11080

1

10540

ST0 MTR00+1

11100

1

10550

ST0 MTR01+1

11120

1

10560

ST0 MTR00+1

11140

1

10570

ST0 MTR01+1

11160

1

10580

ST0 MTR00+1

11180

1

10590

ST0 MTR01+1

11200

1

10600

ST0 MTR00+1

11220

1

10610

ST0 MTR01+1

11240

1

10620

ST0 MTR00+1

11260

1

10630

ST0 MTR01+1

11280

1

10640

ST0 MTR00+1

11300

1

10650

ST0 MTR01+1

11320

1

10660

ST0 MTR00+1

11340

1

10670







# LANGUAGE LAB-C

This month David Jorda  
begins a look at C — a very  
versatile programming  
language.

**C IS AN APPLICATIONS LANGUAGE.** That is, it's used by programmers to write a variety of programs, such as text editors, programming utilities and such like. It is also the 'favourite of the day' in the micro world. Partly because of the popularity of the UNIX operating system (of which C is the language) and partly because of advantages such as its compactness, portability and speed of execution.

The good thing about C is that it is a language for people, not for machines. Many programming languages get designed by committee, but not C. C has gained its popularity not because of any type of backing from a government (in the USA, the funded ADA), but because programmers like it.

So what is C, what can you do with it, and how good is it?

## Why C?

C has many virtues. It is a modern language which incorporates modern control features. It is also a compact language. C can be installed on small machines — such as the 486 — and the code that it produces is compact and fast. Another benefit of C is that it is portable. We have all heard claims that this or that language is portable, only to discover that a major rewrite is necessary before a program can be run on a different system. But with C it really is portable between different computers. If any changes to the source code are necessary, it usually means altering a function in a header file which can accompany the main program.

For those of you who are interested in the 'real' world of programming, it is worth noting that C is the programming language of the UNIX operating system. UNIX is already an accepted operating system in the PC world, and the BBC have decided to adopt it as their official operating system.

C is a compiled language. The program (written in a source code) is first written using a text editor or word processor. The source code is then

submitted to the compiler which, providing there are no errors, will compile the program into machine code and store it as a file which is called the object code.

The steps in developing a C program are a lot more complex than what was mentioned above, but I will guide you a rough way.

## C BASICS

Here is a small C program:

```
1) #include <stdio.h>
2) main () /* This is a demo */
3)
4) {
5)     int i;
6)     printf ("I am a simple");
7)     printf ("computer. I'm");
8)     printf ("My favourite number is 104
9)     because it's a first 10, 400,
10)    }
11)
```

This will print to the screen:

```
I am a simple computer
My favourite number is 104 because it's first
```

On a line analysis (this is what the program does) post-line numbers are not part of C). Line one tells the compiler to incorporate information found in the file `stdio.h`. Every C program must incorporate at least one function and line two identifies the function called `main` (the parentheses are there to identify `main` as a function). The upper entry function identifies the beginning of the function body. Line four is a declaration statement, here the variable `i` has been declared of the type integer. In line five `i` has been assigned with the value one and line six is right print the output.

Line seven indicates the end of the function.

The '104' identifies the macro where and in what form the value before `main` is going to be displayed. The '10' means raw-line carriage return.

In next month's article I shall explain data types and control structures.

## C Power V2.4 by Pro-Line Software Ltd

To the best of my knowledge the C power package is the only C compiler available in the UK for 486. The one you read this a cheaper package called Super C should be available from Fast Software. The reason for this, longer than external review is to give you an idea of what the package offers and is capable of, as it is not the cheapest available.

On with the review! C Power is a complete C development package that will enable the user to produce standalone C programs. Most language packages available for the 486 fall into one of two categories: educational or development. Educational packages (such as the ATLAS natural) do not offer a complete package that can be used to develop software. Instead, they emphasise on introducing the user to the language. Development packages on the other hand (such as GCC and Ophionics Pascal) offer an excellent package, but are not too good when it comes to documentation. I was therefore surprised with C Power, because it is a very full complete offering lots of features as well as providing an excellent tutorial book that used in conjunction with the compiler will enable beginners to learn the language.

The package itself consists of a double sized disk which contains the compiler, shell, libraries and example programs. A 44 page user guide gives details on the compiler and very little else. The big plus is the C Power Plus book that is also supplied with the package, and which can be regarded as a complete tutorial in C.

## Implementation Details

One of the benefits of C is its portability — the ability to run C programs that were written on other machines. Because of this portability is an important factor when developing a C package. Pro-Line



has got a very respectable package with C Power, but of course there are some differences.

In brief, the packages implement standard C, are run-808086 manipulation, some pointers may not be initialized except for character pointers initialized with strings, certain operations under certain conditions will not work (unless the implementation is portable), and most of these errors are not serious, and can be got round quite easily.

The following table lists the size, in bytes of all data types supported by the compiler.

Type	Size
char	1
short	2
int	2
long	2
unsigned	2
float	5
double	8
pointer	2

Looking at the table, you can see that types short, int and long are the same, as are float and double. This practice is not uncommon in micro implementations of C, but is a strange one. For a package of this price I would have expected to see long and double supported.

The library supplied with the C Power compiler is quite standard, however, it would have been a good idea to include functions dependent on the 86, such as some sound and graphics facilities.

## Documentation

The user manual is supplied as sheets of paper which is stapled near the top.

Flash holes enable the manual to be fitted into a ring binder, which is a good suggestion in my copy started by tail to left also a short while. The manual itself makes no attempt to track or introduce the user to C - that's left to the tutorial book. Instead the manual provides information on the implementation of C Power and descriptions of the editor, compiler, linker and so on. One section lists the functions provided with the library that is part of the package. The majority of functions are listed with name, number, order and type the function takes, description of the function and an example. A good idea this, as it will enable the user who wishes to port C source from another machine, to check up on functions to use if they are compatible.

The book 'C Primer Plus' by Walter Pratt & Martin Jones, \$19.95, ISBN 0-672-20090-3 is supplied with the C Power package. Quite simply it is the best language tutorial book I have ever read. The forty some (120 pages) takes the reader from the concept of programming step up to detailed discussion on C. I/O, string's move, it is well written in a friendly (and amusing) manner with plenty of illustrations, summary pages and so on. Even if you don't intend to get the C Power package get this book!

## C Power in Use

The user manual suggests that the system disk should be backed up. To do this, the shell, editor, syntax checker, linker and so on should be copied on to one disk. Another disk should be used to copy the flip side of the system disk, this contains the Subfile 1 and Subfile 1 function libraries.

The compiler itself is easy protected (just very well thought) as once working copies are made, these disks should be at hand. One containing the shell etc, another the libraries, and the third being the master disk.

The SHELL is the first program that is run when using C Power. SHELL itself is a multi-command interpreter. It supports command line arguments and I/O redirection along with the compiler and other programs that are designed to work under it. The nearest comparison would be Basic's screen editor, which can be used to develop, edit and run programs as well as issue I/O commands (such as cd to directory, opening files etc). The command available from the Shell are listed in Table 1.

Entering some C source code then requires the editor to be loaded and run. This is simple done by entering off, optionally followed by a file name if an existing file is to be overwritten. The editor is a very competent one lot of code that provides numerous commands for moving about the text buffer. Once the code is written it can then be saved to disk. A syntax checker is also provided which does what its name suggests - checks the syntax of a C source file. The program is listed as it is being checked and will stop if an error is seen as it found it this is the case. A couple of key presses and you are back into the editor at the place where the error was found. Needless to say that the editor, syntax checker and all the other Shell commands are written in C!

The next stage is to invoke the compiler by entering cc filename. This loads and runs the compiler which produces an object code file.

The last stage is to load and run the linker. This will produce a runnable file and three options are available. First it is possible to produce a C program that will run under the Shell (just like the Shell command). It is also possible to specify a starting address, this means that the C program will have to be loaded and a \$79 call made to the starting address. The third option is to produce a file that starts at the start of Basic.

## Summary

Without a doubt C Power is a very powerful package. It is quite feasible that it can be used to develop commercial programs, and its numerous features give that over a great deal of flexibility.

The only drawback with C Power is its price. It's a very expensive package, and I would have expected such things as more C84 dependent functions, long integers and double precision floating point.

Having said that, its price for overweigh the cost, and I would recommend the C Power package to the novice as well as the professional.

TABLE 1 - COMMANDS SUPPORTED BY THE SHELL

l	list work disk directory
ls	list system disk directory
rm	remove file from work disk
mv	rename file on work disk
gr	get contents of a file on work disk
disk	send command string to work disk
load	load, but not run, command from work or system disk
work	show or set drive and drive number
sys	in above but for system disk
ed	load and run editor
cc	load and run syntax checker
cc	compile C source
link	run linker

NOTE: All the commands are followed by arguments such as file names, drive or device numbers.











# COMMUNICATION

**If you've never heard of  
bulletin boards or you just  
want to know how to get on  
one — read on, David Janda  
shows you how.**

I HAVE BEEN ACCUSED OF DOMINATING Commodore's Corner with offbeat, offbeat black. Well, as promised, here is a (relatively) straight. This month the subject is bulletin boards.

A bulletin board (BB) from now on can best be compared to a community bulletin board. A BB is usually run by a host on a machine with disk drive and auto-answer modem. A BB will allow one user at a time to browse through the files stored on the board. These can include messages from other users, general information, special-interest info, you name it you can put it on a BB.

Compared to Microsoft or CompuLink (I know I would mention them, wouldn't I?), BBs are not technically brilliant, but they are by no means crude. One of the last things about using different BBs (beyond-walking) is that they are not representative of each other; they are not homogeneous — and that makes a difference!

## What Type?

The UK currently has over 300 BBs that operate at regular times, and the number is growing. There are basically two types of BB from which to choose. First there is the traditional scrolling type of BB. To access this you will need several resolution jobs related to its dumb

terminal software. Also, many packs include the type of header. In case you are a Windows (Prestel) user who does not have this type of package, Disklok on page 80007 lists it for \$1.50 should get you going. Computer users can purchase TRY which is at 114007 for \$4.75.

This type of software does not get you any colour or graphics, but enables you to log on to most types of BB.

The second type of BB operates on Windows (Prestel-like) standards. This type of board presents information with colour and screen graphics in a page format. Microsoft Prestel subscribers will not need to buy any additional software, but CompuLink subscribers will need the 100 Windows program at 2020. Again, in with the dumb terminal software, most course software has a Windows mode.

## Which Modem?

Most of the BBs are run at 300 baud. This means that you'll need a modem such as the Voyager 7, Nightingale or Minit modems from Hazale Technology. All three modems will also allow you to access boards at 1200/75 Prestel and scrolling formats. C&M modems won't need any fool hardware by. Many boards now allow access at 1200/75 baud, and some even operate at 1200/1200.

## What's There?

Each BB has its own unique character. But most have an E-mail (Electronic Mail) option that enables you to send and receive messages. These messages can be private, i.e. to another user or be posted on the general board for everyone to see. Other features on this specialty include free downloadable software. Downloading is done in several ways, but by far the most popular is the B-Modem format, so check to see if your course package has this option. Another common feature to be found on BBs are the SBCs — Special

Interest Groups. These are areas which contain information on one particular subject such as airlines, comics, political activities.

There are many other features to be found on BBs. Some even host on-line adventures that you can play.

When using a BB, it's worth remembering that the screen which you are using is two-way. That is, up to you, the user, to help supply the board with information. Have you got any software (or just one)? That's why not upload it for everyone to see. How about asking the System Operator (SMOP) to set up an SBC dedicated to Commodore machines if there is not one there already!

## The List

Opposite is a very small selection of BBs that are currently in operation. All the boards listed open on an 8K hour limit. 1/100 means that you will need that type of modem to access the board. 1200/75 means that you need scrolling type software and a modem such as the one from C&M, to access the screen. Finally, 300 means 300 baud access, which needs scrolling software. C&M modems may well NOT be able to access the type of board.

All the boards listed have a screen which contains phone numbers for other boards. Have fun!

## What About the 64?

To the best of my knowledge, there are only three bulletin boards which are run on the Commodore 64. One is in Aberdeen, one in Dublin and the third is in Denmark. No doubt there are quite a few in the good old UK! What do you think I shall check out next month? I also understand that there is some public domain (not BB software) floating about in Ireland which I shall also track down. As you can see below, running a Bulletin Board on a C-64 is perfectly feasible.

# COMMUNICATION



# CORNER

Name	Telephone	Rate
BARRY	0194 276 806	500
Benji's Bar	01 716 5521	5/Day
Carli's Bar	0203 464 725	5/Day
Cave	0703 546 571	5/Day
CHAS. MASON	0742 367 515	500
Coffee at Home	01 884 5294	5/Day
Hacking 68	01 885 1621	5/Day
Hacking Theater	0752 844 021	500
Livingston 68	098 433 526	500
London 88	01 426 1667	500/12-25
London Underground	01 884 0716	500/1200-25
Miami	01 341 1718	500
Mailbox 68 (Liverpool)	055 428 5034	500/1200-25
McDonald	05 540 4205	5/Day
Norway	0804 30491	5/Day
TRAS. MANDAL	0294 34494	500
TRAS. MANDAL	01 545 5456	500/1200-25/1000-1200

Below is a printout of part of a session on SAGE. Abscon which is on 34 has a demo of 700 baud on 224 78875, right last, no parity. MRS is on a C128 with a 1041 disk drive. The 240 of software items menu by Noel Galloway the Symp using the Mac basic compiler, 800 baud bit.

The time is 04 01 19 One moment loading SPACE 641-power/mouse, CTRL 5-quit 5885 Main Menu (1)  
 5-Home/Status Board into  
 6: Geoffrey-Aig-wil  
 H-Help with this section  
 M-Messaging Area  
 U-User log  
 V-Vel for SYMP

3-Exit Main Menu (1)

1-Print this menu again

684H MU Y 2

1 1 for name 1

The time is 04 01 19 One moment loading SPACE 641-power/mouse, CTRL 5-quit

5885 Messaging menu

C-Control messages  
 H-Help with this section  
 P-Print out messages  
 S-Sync messages to/from

1-Exit Main Menu (1)  
 2-Exit Main Menu (2)  
 1-Print this menu again

684H MU  
 1 1 for menu 1

The time is 04 01 19 One moment loading SPACE 641-power/mouse, CTRL 5-quit

5885 Control messages  
 C-Check Mail  
 D-Delete a message from file  
 H-Help with this section  
 M-Message categories  
 Q-Quick scan of messages  
 R-Read messages  
 S-Send message  
 U-User Menu (1)  
 V-Vel for MU (1)

684H MU Y 1  
 1 1 for menu 1  
 One moment loading

This message 1 1 last message 1 1

Message number (from)-(to) < CR > file  
 1 34 14

One moment loading  
 Message 1 1 (control) section

MESSAGE TO ALL  
 MESSAGE FROM TROUBLE McDONALD  
 SUBJECT - ANOTHER C128 8871  
 DATE: THURSDAY 20 5 85  
 LAST IS A. ROM MEMBER

He told me I have set up a 885 in Dublin Ireland, running on a Commodore 64 with W2000 and 2 disk drives. I am a heavy C128 fan. The 885 software (by me) is called 5885. It is an interpreter - no manual. And it is all in machine code. Give it a meg and you will see. It is QUITE different. It is waiting to see another 885 running on a Commodore 64. Also, what does all this of the new 885 1001 C128 look like with 1041 per default. Anyway, that board is in by now for the trial. Another Commodore Club is called the 100085 and meg Dublin 10140 (M. Hara) on 5 Jan. no par, 1 meg, 500 baud.

684H MU Y 1  
 1 1 for menu 1  
 One moment loading

Last but not least

Well that is it for another month. I shall be reviewing at least five modules and some comment packages. Finally, a special mention to Richard Jones (CHET 882) who wanted his name to appear in 1041 magazine in THE column. Suffice it that I forget to drop me a line on CompuLink 10 12 10004 or Personal 1000007

# CORNER



# STATESIDE NEWS

## Lewis Tilley gives you the update from across the Atlantic.

HAS THIS BEEN FOR COMMODORE the winter of discontent? So just a number of the big items in the US programs like Freeze Frame from Cinco and Super from Starpoint Software, seem to reflect in their names the low point reached by Commodore's stock. By midwinter it had dipped to its lowest level ever of 50, down from an all-time high of \$1 on the NY Stock Exchange.

In the great company on its way out? Here was a company that has sold over four million units of the C16 in such trouble? Here this past Christmas it is rumored that 80% of the sales were of the old reliable, that the C128 was so sluggish that an official shortage in the C16 was caused by holding back supplies of them in the east coast. Other rumors were that the C16 was "underused" in order to raise its price and/or to reintroduce it in a new guise with some fancy new features. The above rumors, modestly, are through the courtesy of John Klenka who writes perhaps perhaps the outstanding computer support group publication in the US "The New York Commodore Exchange Network News" a published monthly in newspaper format to subscribe, write Ann A. Coker Editor, 428 Clinton Avenue St. Brooklyn, NY 11201 USA. It costs in the US \$12.00 a year. Cheap, cheap.

My contact with our groups was greatly expanded by attendance at the 1984 West Coast Commodore Association "Commodore Week II" this February in San Francisco. At least a dozen groups were represented. Leading the field was the proud state of Illinois, The Toronto Pet Users Group, followed by such US groups as the Oregon based US Commodore Users Group, P.O. Box 1288, Roseburg, Oregon 97470 USA, and the above mentioned NYC contingent. No less than one smaller California group, APC, lived in the show in a trailer.

What's a BIG West Coast computer show like? Jammed packed with people and programs. The people were a little older on the average than those I've seen attending the shows at Lark's Court or the International Commodore Show at London last year. But they were definitely not like the threeplace suit, business types that I ran into in San Francisco at an IBM compatible software show that was being held at the same time.

Now for the programs which I mentioned earlier. Freeze Frame by C&R DOD, Inc., 8005 Tanager, Wilmette IL 60091 will quickly fit inside your computer, totally reprogramed any other programs you may wish to load and use. Thus, when you want to make a screen dump you call it with two key strokes and wait. The frame is frozen and memory your printer. You then continue to run whatever you may have at your main program.

Don't confuse two different programs coming from the US both called Superdisk One is a utility from COMPUtek Co. some regional writers in machine language which can store whatever you have on the 1051 screen (up to 40 screens) and then restore it to the display at the printing. The other is a cartridge named Superdisk II which comes from those fine people at C&R Software, Inc., P.O. Box 341, Corvallis, Indiana 46601 who developed the best of the 1041 Disk Drive Alignment Programs (Buy the Version 1.0 at \$44.95, plus shipping).

Superdisk II is not in the "utility" category. It's a utility where you are able to "top" most any program after the protection check and then restore...initially bypassing the protection check. Price on this utility is \$49.95 plus shipping cost.

Remember the coming advertisement from Starpoint Software of Garfield, CA 90041? They announced a utility called STARDISK which would do everything from make game offload. Well, they were blocked from releasing it by a lawsuit slapped on them by S&T US Electric Works, 238 South Whisman Road, Mountain View CA 94041. Skyles says that it was too much like their car-

riage T&E FLASH (\$39.95 + tax plus \$10.00 UK shipping charge) which was developed by the same company's expert.

Starpoint is delivering one of the bastions of the past. They are marketing a 256K RAM board for the Amiga hardware identical to the Commodore 1084 RAM board for 139.95 + \$6.00 shipping outside the USA.

Super, which is also a Starpoint product at \$64.95, is a combination hardware and software package that does the little survey of new utilities in "demonstrations" by capturing and saving the protected program as it runs to the file memory. "This 'superdisk' [to help me then advertise this one as a "superdisk too"] becomes accessible to the user for complete inspection and alteration." The quotation is from Starpoint's advertisement.

The midrange modern modern card games Commodore associated QUANTUM LINK is giving away a 300 level actual modern if you subscribe for four months at \$9.95 monthly. Versus charges you only \$49.95 for a 300 level Vektor 1400 by Another Automation. They throw in a first book on Vektor for free. Player gets a 100 only in combination offer as a magazine subscription to AMIGA, a Player membership list and a modern of you subscribe to Player for three months and pay a first time membership fee of \$10.95.

The three big critically success Amiga Hardware printers selling and software is flowing from the developers like watered up maple syrup. The Electronic Arts Deluxe Paint program begins to really show what this amazing machine can do in painting what else. What's more it integrates with the Deluxe Graphics Music and Printing modules of the same company. The games have arrived too. Night lander from Software Magazine at Waterloo by Kenneth Seltman, Skyles and a re-issue of the Software Golden Cities in King Hill, Adventure and Life from LA are available now.

The C128 is a few features in the waist of two programs designed especially for it. True some very low old programs are being updated such as Waveform and Superdisk. And now that Commodore has issued a new version of CP/M for the 128, which really works this time, all those wonderful old CP/M business programs are there for the taking.

I may be including attention of the PC 16 in upcoming columns the announcement by APR (and others) Relations and US English may be 3-75000. Information Systems in New Commodore is going to try and let the business world with a new service which is compatible with IBM machines. They'll duplicate the PC 16 in the US to clients who want the same compatible with IBM and may even offer a free PC/XT to the less than business who want to try their service. This will all be tied in with Commodore to give a truly total service as well as find a use for all those great Commodore PC 16's.



Joe Nicholson

continues his look at

the C-16. This month

— clocks and timers.

IN THIS ARTICLE I SHALL attempt to explain some of the techniques involved in timing interrupts and so on. I shall start with the keyboard interrupt; it was in the recent to explain every 1980s, at a second the computer interrupts its normal processing to execute a service routine; this updates the clock and reads the keyboard, putting any new key pressed into the keyboard buffer. It then resumes processing. The address contained in bytes \$0004 and \$0005 are the low and high bytes of the indirect values for the location of the interrupt. These values can be referenced in order to make the C-16 jump to your own machine code routine. This method was used in the play routine and the synthesizer article explained last month. After the user routine has been completed the program can then jump back into the service routine to update the counter etc. Alternatively it is possible to jump straight back into processing.

The interrupt is normally on the machine code instruction \$01 from the interrupt #0 and C01 sets it on again. The following routine will set the interrupt vector:

```
$01 interrupt off
LDA low byte
STA $0114
LDA high byte
STA $0115
C01 interrupt on
RTS return
```

Similarly to remove the original interrupt:

```
$01
LDA $00
STA $0114
LDA $01
STA $0115
C01
RTS
```

Note that most of the programming associated with interrupts has to be done in machine code for speed, the instance it is not possible to disable the interrupts from Basic. At the end of the user interrupt routine use the instruction JUMP \$0114 to return

# PROGRAMMING THE C16

to the service routine. To jump back from the user routine to continue processing, ignoring the C-16's service routine, the address contained in \$0114 and \$0115. I won't include a demonstration of this type in the play command published in the December 1985 article on sound, and the sound synthesizer article published last month serve as timing demonstrations.

## Internal Timers

There are three interval 16 bit timers in the C-16. The timer operates at a frequency of 885 KHz on our PAL system machines. It therefore takes an \$004F seconds to count all the way from \$FFFF to zero. Timer #1 has the facility of being able to generate an interrupt upon reaching zero. Each timer is arranged as two eight bit registers in memory, using the normal approach of high byte (in multiples of 256) but preceded by the low byte (remainder 0-255).

The registers are arranged in memory as follows:  
\$1F00 Timer #1 low byte  
\$1F01 Timer #1 high byte  
\$1F02 Timer #2 low byte  
\$1F03 Timer #2 high byte  
\$1F04 Timer #3 low byte  
\$1F05 Timer #3 high byte  
To set a timer simply load the user's registers with the starting value. It will then count down to zero. As the timer will obviously have to be set in two parts, just \$F00 or \$1A for the low byte and one for the high byte (these should therefore be a delay of no greater than 125 us between setting the low byte and the high byte, otherwise the timer will start to count down and therefore to be set incorrectly).

To eliminate this problem therefore, the timer registers should be set in machine code using the following type of routine:

```
$01 disable interrupts (no  
$02 $ 001 a 16-bit delay
```

interrupt to occur between writing the low byte and the high byte)

```
LDA low byte of start time  
STA low byte of timer  
LDA high byte of start time  
STA high byte of timer  
C01 turn the interrupt back on  
RTS return
```

## The Timers and Interrupts

Timer #1 is a more sophisticated timer than timers #2 and #3. When the timer is written to, it sets the timer to the value it registered, but also sets the timer #1 related registers so that when the timer then counts down to zero, at which point an interrupt is generated. It is these at the interrupt mask register is set. Bit 0 of the interrupt status register is then set. The timer is then reset to the related value, and the counter carries on down counting until it reaches zero when another interrupt is generated etc.

Timer #1 is potentially a very useful timer allowing periodic interrupts of specified delay length. For instance timers are used to generate accurate bit delays in a data rate loading system which is under development.

Timer #2 and timer #3 are simpler timers. These timers go back to \$FFFF after they have reached zero, instead of being reset to a related value. They still have the ability to generate interrupts when they reach zero however. To turn interrupt for timer #2, \$1F03, and reset it to the interrupt mask register. When the interrupt takes place, the bit of the interrupt status register is set high.

## The Interrupt Mask

The interrupts are turned on and off by setting/resetting bits on a register called the interrupt mask at \$1F06, or decimal \$2006. Bit 0 can be

used to control the following:  
bit 0 timer interrupt  
bit 1 timer 1 interrupt  
bit 4 timer 2 interrupt  
bit 6 timer 3 interrupt  
bit 7 interrupt request.

Setting a bit high on the mask byte will enable the appropriate interrupt. Bit 3 light pen! There is no connection for a light pen on the edge connector, but there may be on the joystick port.

## The Interrupt Status Register

This byte (at \$1F06 or \$2006 decimal) or \$0016 which interrupt has interrupted. It is important for the interrupt service routine to know just which interrupt has been used so that it knows how to set the arrangement of bits in the register is the same as the interrupt mask register (i.e. bit 0 is the timer #3 interrupt bit). Similarly to set a bit on in the register, write that bit with a one. Similarly write the bit with a one to reset that bit. Any interrupts from the C-16 are recorded by the C-16 setting the appropriate bit of the register.

## Timer Interrupts

It is interesting to note that the three timer interrupts can still be used even when the timer and interrupt requests have been disabled with the \$01 command. This is the technique used in the saving and loading of programs in the C-16. (The routine at \$1004, for instance) (Figure 1 is used before a loading/saving a block) header in the C-16. The routine at \$1070, shown in Figure 2, is the opposite of the routine of \$1004 and is used after loading/saving a block/block.

However it is not always necessary to perform timing intervals using the method



















versatility of supporting software, data storage is, in the whole, less efficient and unsuited to problems where a search with short paths and large software.

The 1541 Disk Drive evolved from the 1540, which was designed for the Vic 20, and because of the limited amount of memory in the Vic, Commodore had to find a way around a memory bleed (DOG) to save bits for the 1540 (an intelligent format-less device which compiled all its own formatting, reading and writing, as well as minor sequential and random access file handling). Unfortunately, it was read (floppy), not parallel (fast), and a bit quiet (a few bugs of convenience) though it was a dual drive! But, after all, anything was better than tape. When the 64 is read as the home computer, some it was decided a new disk drive should follow with it, but as the Vic was still selling, the new drive would have to be compatible with the old. So we have the 1541, still slow with bugs, but relatively cheap, quite efficient, and pretty reliable.

Because the drive is intelligent, and thus self-supporting, there is no need for other disk controllers or dedicated disk software inside the 64. The format used inside the 1541 is a 6002 based computer much like the Vic or 64 with RAMs, ROMs and interface chips. This means that at the end of your serial link is a fast storage device which will be in a similar standing, as for programs used, will be the same as the host computer, it is attached to.

## Inside the 1541

If you are prepared to open up the 1541 you will find relatively little inside that looks like a computer. The circuit board, using atop the main controller and the drive mechanism, contains the control chips, cassette interface board and the actual computer circuitry at the back. This is much more sparsely than the Vic or 64 boards, as it needs neither video nor visual related chips. Two 6002 Versatile Interface Adapters handle serial bus communication and control the drive mechanism as well as supplying timing and interrupt facilities for the program. The Disk Operating System software is held on two 65C04 chips and 12 of 64Kb, not only provides the necessary work space for the 6002, but is also used as buffer storage. A handful of other support chips, including an address decoder, complete the quirk.

## 1541 Block Diagram

The 1541 or DOG is split into two sections, the Interface Processor or IP for short, which manages the two computer related functions such as file manipulation and serial bus communications, and the floppy Disk Controller or DC, which controls the head write head and data storage. The 6002 Processor has to share

time between the IP DC and the IP which also reduces the effective operating speed of the 1541. The DC, IP and Interface Chips will all be elaborated on individually as the series progresses, together with a full RAM memory map.

## Disk Format

In order for the DOG to find its way across the disk a format routine needs to divide the disk surface up into tracks and sectors. 16 tracks are formatted in all tracks, one being the lead and outermost, and track 16 the innermost, with the directory on track 15. Each track is further divided up into 17 or more 256 byte sectors, numbered ones upwards. To put as much data onto the available space, Commodore adopted a scheme where the number of sectors on a track was either 16 or 17, and thus longer, the track is. However, this method by itself would not have worked because even if the Read-Write head is positioned on track one, or 16, it still takes the same amount of time for the disk surface to rotate once. The larger the track, the higher the velocity it has when a pattern, under the head, crosses it, so the data is actually written faster and read to and from the disk at a faster rate depending on how far out the track is. The data has to "clock" in and out at approximately 360,000 bits/sec on the outermost tracks and 250,000 bits/sec on the innermost. The track layout is divided into four different zones.

(Frequency Modulation) which involves writing a stream of clocking bits with a data bit occurring in between if a 1 needs to be written. This is dependent on data storage space and so the 1541 was designed to use a 444-clocking method called Group Code Recording. GCR for short (Apple the other way use GCR) prior to being written onto the disk, every data byte is converted into a form which can neither be modified as a type, nor affect reading accuracy. This is achieved by splitting the byte into two halves, or four bit nibbles, and using a lookup table in the ROM to convert each half into a five bit result.

For example, to convert the right bit byte 149 (10010101) into GCR, the byte is first split into two four bit nibbles, 1001 and 0101. Using the conversion table these nibbles now become 1000 and 0101 respectively, and to our templated GCR byte is 1010001011. Using Group Code Recording, no combination of any four bit GCR nibbles will ever produce the same stream binary ones (up to a zero mark) and no more than two consecutive zeros will appear in a 10-bit GCR byte or combination of bytes, this is for speed reasons when clocking two bits into the 1541 during a read. However, we now have a problem when manipulating the data. The 6002 can address only one eight bit byte at a time, whereas our new byte is now 10 bits long. Therefore the conversion routine inside the DOG actually converts four bytes at

Zone	Track No.	Sector Range	Sectors/Track	Clock Rate
1	1-17	0-28	21	367,402 bits/sec
2	18-24	0-18	16	285,714 bits/sec
3	25-36	0-10	11	254,467 bits/sec
4	37-45	0-16	17	258,000 bits/sec

## Data Encoding Scheme

Commodore again opted for a more space efficient recording method using the individual bits on the disk. The most commonly used storage scheme is FFM

(Frequency Modulation). This is not necessarily superior to bytes (which can be converted by an eight bit processor at 1 bit/clock cycle @ 100 = 1 \* 8-bit/bytes, thus, when writing data, four eight bit bytes can be collected and then converted into four GCR 10-bit

## GCR Table

Hex	Binary	GCR	Hex	Binary	GCR
000	0000	01010	100	1000	01001
001	0001	01011	101	1001	11001
002	0010	10100	102	1010	11010
003	0011	10111	103	1011	11011
004	0100	01100	104	1100	01101
005	0101	01111	105	1101	11101
006	0110	10100	106	1110	11110
007	0111	10111	107	1111	10101



bytes, and always in two eight-bit bytes. This all sounds a bit confusing, so you'll pardon the jargon to tell them you do, example:

```
a 4-bit bytes: 000 000 001 001
as binary: 00000000 00000001 00000001
00000001
```

```
a 4-bit address: 0000 0000 0000 0000 0000
0001 0000 0000
as 5-bit CCR: 00000, 00000 00000 00000
00000 00000 00000 00000
```

```
as 4-bit CCR: 00000000 00000000
00000000 00000000 00000000
as hex: 002 075 045 020 040
```

Thus our original four eight-bit bytes 000-044-081-020 are actually written onto the disk surface as 002-075-045-020-040. Reading CCR bytes off the disk is merely the reverse process mentioned.

```
5 CCR bytes: 002 075 045 020 040
as 5-bit CCR: 0000000, 0000000, 0000000,
0000000 0000000 0000000
```

```
as 5-bit CCR: 00000 00000, 00000, 00000
00000 00000 00000, 00000
4-bit address: 0000 0000, 0000 0000, 0000
0001 0000, 0000
```

```
in binary: 00000000 00000000 00000000
00000001
```

```
a 4-bit bytes: 000, 000, 001, 001
```

Simple really.

## Sector Format

Each sector on a track is composed of two main parts: the Header Block, or ID field, which supplies information on the position of the sector and the Data Block of data. Preceding each of these fields is a unique synchronization field or Sync Mark, used to identify the beginning of the block and immediately following the block is a short gap which gives the DCC breathing space to allow for fluctuations in drive speed. The sector header is written only once during formatting and the data field (excluding its sync mark) is rewritten every time data needs to be recorded on the disk.

## Header Block

a) Sync Mark: Written as two eight-bit CCR 000 bytes (4-bit sectors) over one half the byte mark is a flag indicating the DCC that a block is coming up next.

b) Header Block ID: This is the block identifier byte which informs the DCC that this is a header field. Its value always 00.

c) Header Block Checksum: This is the header field checksum byte created by adding together the track number, sector

number and the two IDs.

d) Sector Number: Numbered consecutively from two upwards to track number. Positioned at the track on the disk.

1-01 000 and 001. These are the formatting IDs specified in the instructions "NO NAME ID" where 1-000 and 0-000 (Note: 000 000) is the current order as written on the disk.) These are the IDs that the DCC uses for initializations and during all read and write operations, not the formatting IDs listed in sector 000 b) 000 bytes. These are 4-bit bytes used in padding when the DCC is converting the header transfer map CCR (Header) into the DCC's four eight-bit bytes as a transfer CCR conversion. These bytes are never relocated again by the DCC after formatting.

f) Header Gap: eight eight-bit CCR 000 (00000000) bytes, providing the DCC with breathing space between the header and data fields.

## Data Block

g) Sync Mark: Marks the DCC a block is coming up.

h) Data Block ID: Informs the DCC that this is a Data Block. Its value is always 00.

i) Data: 200 bytes of user data.

j) Data Block Checksum: This the data and a block are created by adding all the 200 bytes of data together.

k) 0-000 bytes: filler bytes used in padding during CCR conversion.

l) User Sector Gap: This is also known as the full gap and is the space between our and 12 eight-bit CCR 000 bytes, gap giving the DCC with space in between each sector to allow for fluctuations in drive speed. In use is determined during the format sequence, which contains a routine which stores how long the disk takes to rotate once. The gap size is calculated from this, timing, and so explains not only why the format routine can be long, but also why "Fast Formatters" are occasionally unreliable. Checksums under full gap formatting are either three-bit based that the less space on the track appears to ever write the first eight-bit. Fast Formatters can find gap formatting (usually eight bytes long).

Our sector is now larger and much more complicated than at first sight. Its actual size is calculated like so:

Section	4-bit Data	4-bit CCR
Sync Mark 1		3 bytes
Header	4 bytes	00 bytes
Header Gap		8 bytes
Sync Mark 2		3 bytes
Data Block	200 bytes	320 bytes
Data Gap		4-12 bytes

TOTAL: 324-40 bytes long



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... why  
would  
anyone  
play  
anything  
else?





Stuart Cooke takes a look at a new range of disk based budget software.

# BUSINESS

IF YOU'VE EVER WANTED TO BUY a wordprocessor, database or any other type of business software for use with your Commodore computer then you will have been amazed at the price. It is not unusual for over £100 to be asked for a wordprocessor. A few companies, notably SuperSoft and Mastermind, have produced a few cheap, professional programs at around the £15 mark. Here a new range of disk based budget software is set to hit the streets at a price of only £7.99. This makes it far cheaper than a great deal of software that is available on cassette.

So what's the drawback? A disk for golly might cost more than a tape but one fault that there are a few comments on getting the software out so cheaply. There is no fancy packaging. A clear plastic pack is used so that the disks can hang on pegs in shops. There are no manuals with the software, the instructions on the packet simply tell you how to load the program. Finally, most of the programs are in Basic.

Don't let any of the above factors put you off the software though. The lack of instructions is usually - I say usually because one important program has no instructions - one is usually very clear help options within the program. Even though many of the programs are written in Basic they all work extremely well and do what they should. In fact many of the programs in the range work better and look better than their more expensive competitors.

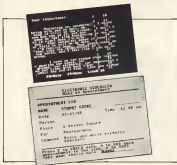
The name of the new range of software is Load'n'Go! The range is imported over from America. In the States the programs sell extremely well in supermarkets with a price tag of around \$5. Who knows, we may soon be able to buy a Wordprocessor at the same time as our cornflakes.

Load'n'Go! software falls into a number of different series. The series that is being marketed over here at the moment is the 'Home Management Series'. A lot of this range of software could be put to good use in either a small business, or at home, for a number of reasons. It is made for people like you.

So what's the software really like? The best way to answer this question is to have a look at some of the packages individually.

## Love Letters

At £7.99 Master Mind must be the cheapest wordprocessor available. It has many of the functions of its dearer competitors such as search and replace and the ability to set line spacing and margin. It does however lack the more 'upmarket' fancy bits such as page numbering and headers and footers. Another



Wordprocessor is due to be released at a later date that will have all of these facilities plus many more.

As wordprocessors go this one isn't particularly fancy. It will however require you to have a masterpiece without complaining at all. In fact if you're not too good with the old pen a selection of business letters (you're head and), Home letters (for family use) and love letters (yuck!) are provided on the disk.

## Adding it up

Another program in the series is 'Personal Spreadsheet'. This one is a little disappointing. For a start there are no clear instructions anywhere. There are no help functions, except with the different types of calculation. This means that the only way to figure out what the package does is to actually use it. If you have never come across a spread sheet before then I suggest that you find out what one is and how it works before you look at this program. If you have already used a spreadsheet then you will most likely be disappointed with this package.

Basically 'Personal Spreadsheet' is a glorified calculator. You can store numbers in the columns and rows and then perform simple calculations on them. You cannot set up formulas in locations as you can on other spreadsheets. Since a spreadsheet is supposed to help you if you have a lot of numbers to work with, I think the program is the biggest let down of the pack. A normal calculator will perform the same job as this program, and is far quicker.

## On Time

Like me, you are always forgetting appointments or forgetting what time you are supposed to be somewhere, you will find 'Electronic Scheduler' a must.

This program is used for recording all appointments. You can enter the name of the person who the appointment is for, the means that you would get the whole address. Appointments enter the program. What time and date the appointment is, what the appointment is with, where it is and any comments that you need.

Once you have entered in the data you can search for all meetings for a certain person after certain dates. You can be all



# ON BUDGET



meetings between dates. It is even possible to print details of all meetings at a certain place or with certain people.

How, as a result, did I save money without this one?

## Money Matters

A couple of financial organizers are included in the series. There are *My Financial Organizer*™ and *Home Income Organizer*™. Both disks enter checkbooks and address list programs, while the *Financial Organizer* also has a calendar and the *Home Income* package has a budget program.

One very nice feature in the *Mail List* manager on the *Pay* disk is the ability to code names and addresses, such as an "R" for friend or "B" for business. When you want to print out your labels you can then print them out for just one group.

A very nice "extra" to the Christmas card list. For each record you must specify whether you want them on your Christmas card list or not. You can then get a count of how many Christmas cards you will need and then get the computer to print out all the labels.

The calendar is one of those silly **PLEASE GIVE ME THE YEAR** type of programs. You know, you give it the year and the month and it prints out a calendar for you. One extra feature is the ability to highlight a specific date. This would be given if you could highlight all dates with any birthdays of friends but since you can only highlight one date every month this is probably out of the question. What a silly tool!

The files replace the functions of the other programs on these disks and I don't think that I need say anything more about them apart from that they work well. In fact if you used either of the checkbook programs you would know exactly how your finances were at any time.

Both disks are good in certain ways. If you want addresses then go for the *Home Income* pack, if you want budgeting and programs then I think that the *Home Income* pack is a little better.

The packs are so cheap that it's well worth buying both.

## More Info

If you require more information with your address list then you could have a look at the *Home and Business Card File* disk.

This is very similar to the address programs that are mentioned above but it also allows fields for business and telephone numbers. I did have a few problems with this program. For a start there wasn't enough room for many of the addresses that I used to enter and secondly they are in the American format of City, State and Zip. Since the programs are in Basic it would only have been a simple task to turn these formats into English! It may even be possible to make the changes yourself.

Don't forget the other 'g' base. This is a proper database program. By proper, I mean that you can define your own fields for data entry. This means that if you wanted to make an address list you could mark with ZIP etc. If you wanted you could even use the program to keep a catalogue of your records or stamps. In fact a base can be used to store information about anything that you could put on a card. Having the information on computer means that it is a simple task to find specific details or print out a list etc.

## Keeping Tabs

Obviously with disk software becoming so cheap the number of disks in your collection is bound to grow. How on earth are you going to keep track of them all?

Well, *Disk Unions* will solve this problem for you. This program will store information on up to 100 disks. You can search for a specific program and you will be told what disk it is on. You can get a print out of the addresses of all your disks. It is even possible to print out a list of all the IDs that you have used. As you are probably aware the Commodore disk drive uses a two digit ID to identify each disk. If two disks have the same ID the disk drive may not know if you swap the disks, thus messing up the contents.

The *top* or *used* IDs are printed on the form of a grid with letters and numbers being across the top and edge of the grid. It is now easier to tell how disks as you format them.

As well as the catalogue program there is also a utility program. This will allow you to backup disks (not protected ones) format disks etc.

At a price of only £7.95 this disk is a must for any disk drive owner.

## Verdict

Most of the programs available are around the same quality as a good magazine listing. They are all functional and do what they set out to do without any kinks.

At £7.95 this software should make a very big impact on the home-based business market, perhaps with the same sort of impact that *Mastercard* made when it launched its £1.95 tapes.

With money, good business software at this price may make people start to use their computers for something other than games. This wouldn't be such a bad thing.



# IN PRINT

**Eric Doyle has been trying  
out a real hardware bargain.**

WHEN I READ THAT THE AMOBI L20-1 printer claimed letter-quality printing and that the price was less than IBM's big immediate-response unit, to say the least, one of disbelief. After unpacking the basic (unexpanded) equipment, the printer had looked very Markey-Mokey at first when I read printed-out my absolute changes.

Surprisingly, the machine does produce letter quality and it does so in a very novel way. The printer head resembles an office doirstamp. You know the kind: rotate the wheel to get the correct class, then ink the rubber-faced letters on a pad and stamp away. In this novel little printer, the characters are carried on a cylinder which carries four bands of characters. At the back of the wheel is an inked cylinder which is when against the letters as they rotate and each character is pressed against the paper when required to produce very high quality letters. High-tech still has a place for the good old principles pioneered by Gutenberg.

The limitation of the printer lies in the fixed roller idea. The characters you get are the ones you're stuck with. No graphics screen dumps or character-set Commodore symbols just plain and simple alphanumeric and punctuation.

The paper is fed into the printer with no rollers for friction feeding. This means that as a cheap printer for word-processing applications it can use high quality, bonded paper instead a good word-processor would be a bonus to anyone owning this machine because it doesn't have a "paper out" indicator. When the printer reaches the bottom of a page, the paper rolls in a gap in the paper and the head carries on printing to and fro across the same line. A couple with the facility to calculate a page length would overcome this fault.

For most people the main application they would look for is the ability to print out listings of their latest program for a less-than-stunning result. Obviously the problem here is that most people will

more than a sheet of A4 paper and estimating how many lines to a page would be a nightmare. I found that normal A4 tractor-feed paper would not fit the platen mountings but you can buy paper which is A4 width including the perforations and this is fine for most purposes as long as the paper doesn't slip in the platen rollers.

Control of the printer is limited to the basic character codes of the Commodore line: example, CHRS(35) followed by CHRS(26) will initiate a line feed and have the printer start at the beginning of the next line. CHRS(26) sets the printer to normal line spacing and CHRS(26) will allow double spacing for extra clarity.

The number of characters available is limited to 128. This includes all the alpha-

betical characters of a daisywheel. Because the printer has to move up and down the paper frequently, this means that a speed of 10-12 characters per second is the maximum that can be achieved. In real terms this means that a 50-line page of A4 text will take about five minutes to print which is not too bad considering the quality.

The total size of the printer is about 12 inches by nine by two, which means that it takes up very little room on a desk and the only annoy is the paper advance and the on/off switch so it is not too complex to use.

My only quibble about this machine are the tendency of the friction feed to slip and the problem of what happens when the paper feed wears down. To be



numeric characters and punctuation marks. In the main these correspond to Commodore's version of ASCII but some of the characters around CHRS(70) vary. The most important difference is that the ground sign has an ASCII value of 123 instead of 93 but a little bit of thought should overcome this problem.

Despite the Heath-Robinson appearance of the printer, the quality of the printed material is excellent. After a while the letters may get a little faint as the emulsion of their surfaces becomes broken but this can be corrected by the simple application of more ink on the roller giving a result indistinguishable from the quality of a typewriter.

The speed of the printer is comparable

for more is a minute that half which may have been had out of the hands of others and the resistance of the printer feed seems to promise a fairly long life.

The cost of the printer should be seen in the light of the need for a continuous interface. I believe Boots sell one for around £20, so if you need the market for a cheap printer with high quality results and you're willing to accept the 20th Century edginess that hackers can't be choosers then this is definitely a machine to consider. The only other printers in the price are thermal printers and with the cost of thermal paper these days it could be worth while considering a machine with low per-character overheads in which case this could be the best for you.

























HAVE YOU EVER WANTED TO GET INTO communications? Would you like to get in touch with other Commodore users? Well, Your Commodore, together with Compuserf, has planned to announce the start of Club 128 and give you a chance of a special membership offer.

Club 128 will appear on Compuserf as a "free access" area open to all CNET subscribers.

The club will be the focal point for all "serious" users of Commodore computers, hence the 128 affiliation. The 128 doesn't mean that owners of C64s can't join. In fact the club is open to all Compuserf members, though only "serious" users are expected to make a great deal of use of it.

Many sections of Compuserf are due to be "pulled in" to this online area, including the Database business section that is already in existence.

Your Commodore will have a magazine section within the club area where you will be able to find news and the latest programs that are published in the Magazine.



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